October, 1944

THE FOUNDRY

FIFTY-THIRD YEAR

PUBLIC LIBRARY
OCT 5 1944
DETROIT

TECHNOLOGY DEPT.

Photo Courtesy Cleveland Tramrail Company

FAMOUS CORNELL FLUXES
Trademark Registered

for Brass and Aluminum Castings there are Special Famous Cornell Fluxes, each having Definite and Exclusive Features and Advantages

From CUPOLA to Final CASTING

DEFINITE IMPROVEMENT IS EVIDENT!

● Consistent use of Famous Cornell Cupola Flux results in manifold improvements in foundry melting operations.

Time is saved in charging. There is no messiness and no measuring. Simply add a brick to a ton of metal.

The iron is hotter and more fluid causing rapid elimination of slag and other impurities. Ladles are cleaner, as evidence of the purging and purifying action of the flux in the cupola.

Cleaner drops are assured due to the flux glazed surface of the melting zone and fluidity of the slag. Less picking is necessary. Firebrick or stone linings last longer.

Castings are Denser—More Machineable and more capable of withstanding pressure, despite the large percentages of scrap used today.

And yet, with all these advantages, Famous Cornell Flux, costs less, everything considered than straight limestone. Write for literature and prove these facts to your own satisfaction.

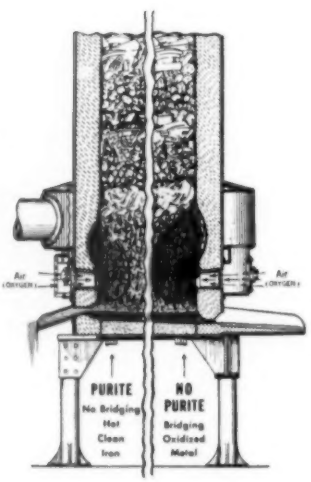
The CLEVELAND FLUX Company

1026-1036 MAIN AVENUE, CLEVELAND, O.

Manufacturers of Iron—Brass and Aluminum Flux since 1917

SPEED PRODUCTION OF SOUNDER CASTINGS

PURITE restricts the combustion zone to a smaller, hotter area in front of the tuyeres, prevents bridging and reduces oxidation of the metal.



Purite is used with limestone in the ratio of 1 part Purite to 10 parts stone on the bed coke and 1 part to 20—40 parts stone on regular coke charges.

To insure sounder, better machining castings, use Purite

Refining with Purite, whether in the cupola or in a mixer ladle, purges the molten metal of oxides and silicates which produce sluggish iron, shrinkage and segregation defects.

Purite pays dividends in better cupola operations and cleaner stronger castings.

Can you afford to overlook this means of improving your competitive position in the castings industry.

THE SCIENTIFIC FLUX FOR BETTER MELTING AND CLEANER IRON

PURITE

THE MATHIESON ALKALI WORKS (INC.)
60 EAST 42nd STREET, NEW YORK 17, N. Y.
(Licensee of Metallurgical Development Company, Inc.)

In Canada: Railway & Power Engineering Corporation, Limited

MEN AGAINST MISHAP

SIGNS LIKE THIS, at strategic locations, are helping twenty-four hours a day to promote safe working practices in Bethlehem steel plants and shipyards.

SAFETY CAP, worn by many women employees, is made of light, cool cotton, with snood covering hair. Visor shades eyes, and serves as a bumper to warn wearer in case her head approaches too close to work.

STAIRWAYS FOR SHIPBUILDERS, in a Bethlehem yard, take the place of long side-shell ladders. Traffic is one-way, and employees may carry small tools and materials, dangerous on an ordinary ladder.

SAFETY INSTRUCTION. Bethlehem employees doing specialized work and using protective respiratory equipment are trained by safety supervisors with many years of experience.

IN Bethlehem steel plants and shipyards, there's a never-ending battle being fought—a campaign against that wily old tactician, General Mishap. The general is wise in the ways of human frailty, and a master of feints, flanking maneuvers and ambuscades. The results of his forays can be serious indeed. Industrial accidents are deplorable any time and anywhere, but in wartime they are, in addition, an effective saboteur of vital production.

Ever since the war emergency developed, and thousands of men and women, without experience in industrial work, began to enter its plants and shipyards, Bethlehem has been redoubling its efforts toward employee safety. Physically, by means of new safety devices, and more protective clothing, safety shoes, goggles, helmets, and the like. Educationally, by a stepped-up program of safety meetings and first-aid instruction, bolstered by signs, posters and warning flags, lectures, booklets and motion pictures.

The safe way of doing his job is impressed upon the new Bethlehem employee from his first day of work. And safe working practices and the avoidance of hazards are continually emphasized to newcomers and veteran workers alike.

Thanks to the unceasing effort to make safer workers and safer working conditions, even during this wartime era of peak production and the largest working force in Bethlehem history, our safety standards have steadily risen.

Significant of what has been accomplished in making war work safer for the worker is this encouraging fact: statistics show that *the Bethlehem worker runs less danger of being injured while at work in the plant, than during his spare time when he is off the job.*

WORLD'S LARGEST SHIPBUILDER

★ ★ BETHLEHEM STEEL ★ ★

SECOND LARGEST STEEL PRODUCER

Steel, Manufacturing and Fabricating Plants at . . . Bethlehem, Steelton, Williamsport, Johnstown, Lebanon, Pottstown, Rankin, Leetsdale, Pa. . . . Buffalo, Lackawanna, N. Y. . . . Sparrows Point, Md. . . . Chicago, Ill. . . . Tulsa, Okla. . . . Corsicana, Tex. . . . South San Francisco, Los Angeles, Alameda, Calif. . . . Seattle, Wash. *Shipbuilding and Ship Repair Yards* . . . Quincy, Hingham, East Boston, Mass. . . . Staten Island, Brooklyn, N. Y. . . . Hoboken, N. J. . . . Baltimore, Fairfield, Sparrows Point, Md. . . . San Francisco, Alameda, San Pedro, Calif.

THE BENTONITE

100 LBS. NET
FEDERAL
GREEN BOND
REG. U.S. PAT. OFF. NO. 241458
IS A 100% MINERAL SAND BOND
OF PROVEN, PRACTICAL QUALITY
USED IN ALL CLASSES OF FOUNDRY
SAND IN GREY IRON, MALLEABLE
AND STEEL FOUNDRY PRACTICE.
SOLD with SERVICE
Manufactured By
THE FEDERAL FOUNDRY SUPPLY CO.
CLEVELAND, OHIO. · UPTON, WYO.
New York - Chicago - Detroit -
GREEN BOND

STRENGTH...SPEED...UNIFORMITY

STRONG—Green Bond is strong. Careful selection and pre-testing of deposits—laboratory control of every processing step guarantees its strength when it reaches the foundry.

FAST—Green Bond is fast. It blends with sand so quickly that it's the ideal bentonite for use in today's high-speed mullers. Uniform grind makes it fast. For real speed, it's Federal Green Bond.

UNIFORM—You can establish your batch-mix with Green Bond permanently. Careful selection and processing by us ensure a constant, never-changing mix to you.

THE FEDERAL FOUNDRY SUPPLY COMPANY

4600 East 71st Street · Cleveland 5, Ohio

Second Floor
CROWN HILL, W. VA. · CHICAGO · CHATTANOOGA, TENN. · DETROIT · MILWAUKEE · MINNEAPOLIS · NEW YORK · ST. LOUIS · RICHMOND, VA. · UPTON, WYO.

Chas. A. Ralfe & Co., Foshay Tower, Minneapolis, Minn. · Claudebrooke Co., Los Angeles, Calif. · Pacific Graphite Works, Oakland, Calif. · LeGrand Industrial Supply Co., Portland, Ore.

IN CANADA—Shanahan's Ltd., Vancouver, B. C. · [illegible] Hamilton, Ont. · Claudebrooke Engineering (Canada) Ltd., 642 St. Paul St. W., Montreal, Que.

THE FOUNDRY

for

OCTOBER 1944

VOLUME 72 — NUMBER 10

Editorial Staff

FRANK G. STEINEBACH
Editor

PAT DWYER
Engineering Editor

EDWIN BREMER
Metallurgical Editor

WILLIAM G. GUDE
Associate Editor

DON S. CADOT
Art Editor

New York . . . . . B. K. PRICE, L. E. BROWNE
Chicago . . . . . E. F. ROSS
Detroit . . . . . A. H. ALLEN
Pittsburgh . . . . . R. L. HARTFORD
Washington . . . . . L. M. LAMM
London . . . . . VINCENT DELPORT

Advisory Staff

JOHN W. BOLTON
ALBERT E. GROVER
JOHN HOWE HALL
N. K. B. PATCH
HARRY A. SCHWARTZ

Business Staff

J. M. LATHROP
Advertising Manager

R. M. KLEIN
Circulation Manager

New York . . . . . J. F. AHRENS
Chicago . . . . . G. A. POPE
Cleveland . . . . A. L. KLINGEMAN
Los Angeles . . . . . F. J. FULLER

Main Office

Penton Building, Cleveland 13, Ohio

Branch Offices

New York, 17 . . . . 16 East 43rd St.
Chicago, 11 . . . 520 N. Michigan Ave.
Detroit, 2 . . . . . 6560 Cass Ave.
Los Angeles, 4 130 N. New Hampshire Ave.
Pittsburgh, 19 . . . Koppers Building
Washington, 4 . . National Press Building
London . . . . . 2, Caxton St. Westminster, S.W. 1.

THE FOUNDRY is published monthly by THE PENTON PUBLISHING CO., Penton Building, 1213 West Third Street, Cleveland, O. EARL L. SHANER, President and Treasurer; GEORGE O. HAYS, Vice President and General Manager; RUSSELL C. JAENKE, Vice President; FRANK G. STEINEBACH, Vice President and Secretary, and EDITH L. WERNER, Assistant Treasurer.

Subscription: In the United States and possessions, Canada, Mexico Cuba, Central and South America, one year $2.00; three years, $5.00. Single copies 25 cents. Copies published three months or more previous to date of current issue, 50 cents.

Member: Audit Bureau of Circulations, Associated Business Papers, National Publisher's Association.

Copyright 1944 by THE PENTON PUBLISHING CO.

Entered as second class matter at postoffice at Cleveland under the act of March 3, 1879.

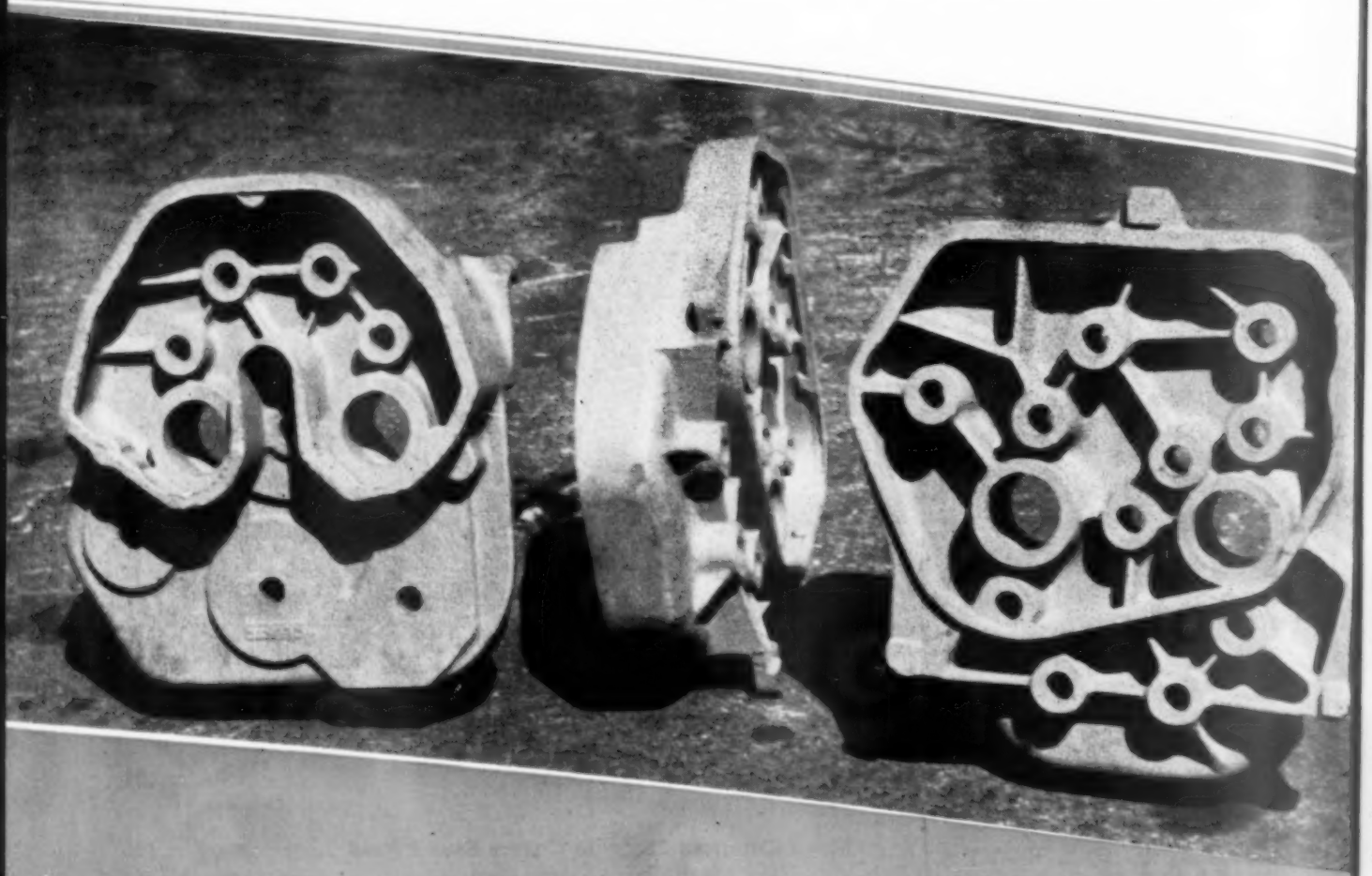
	Page
Editorial	73
Steel Foundry Pouring Practice By JOHN HOWE HALL	74
Patterns of Gypsum Cement (Part I) By E. H. SCHLEEDE	76
Coke Properties and Cupola Melting (Part I) By B. P. MULCAHY	78
Efficient Utilization of Compressed Air in the Foundry By J. L. YATES	80
Facilities for Water Quenching Steel Castings By R. H. SWARTZ	82
How To Melt Bronze (Part II) By A. E. CARTWRIGHT	85
Gray Iron—Steel Plus Graphite (Part III) By JAMES T. MacKENZIE	86
Know Your Costs By WILLIAM M. CALDWELL	89
Convert Garage into Foundry By PAT DWYER	90
Around Detroit—Foundries Prepare for Reconversion By A. H. ALLEN	114
Heating Ventilated Industrial Buildings By DAVID HENDERSON	119
The Adventures of Bill By PAT DWYER	124
How Much Is the Job Worth? By EUGENE J. BENGE	131
Metal Congress Program Covers Broad Field	186

Questions and Answers	94	**Equipment and Supplies**	148
Men of Industry	100	**Washington Notes**	182
Foundry Developments	112	**Obituary**	188
Foundry Group Activities	132	**New Trade Publications**	240
Industry Briefs	144	**Where-to-Buy Directory**	242
Readers' Comment	146	**Manufacturers' Literature**	257

Index to Advertisers 288

FOR BRONZE

This fine bronze casting has been in heavy production by the James Hunter Machine Company, North Adams, Mass. It is 18" x 18" and weighs 88 pounds. Further details, including use, customer, etc., are censored. The casting is made entirely in Linoil dry sand and must be accurate to a very fine degree of tolerance. Suprisingly few castings have been lost. Linoil is uniform to a very fine tolerance also, and any foundryman who has the responsibility in long war-rush production jobs knows what a beautiful thing is truly uniform core oil. Even if your work does not require microscopic exactness uniform core oil is one of the best guarantees of actually making the profits you planned on making when you took the order. Linoil is the logical oil. Also, of getting all shipments off on schedule.



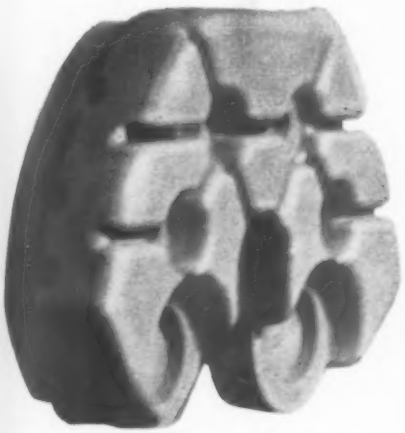
THE WERNER G.

(DIVISION OF ARCHER-

2191-WEST 110 STREET WOODBINE

USE LINOIL!

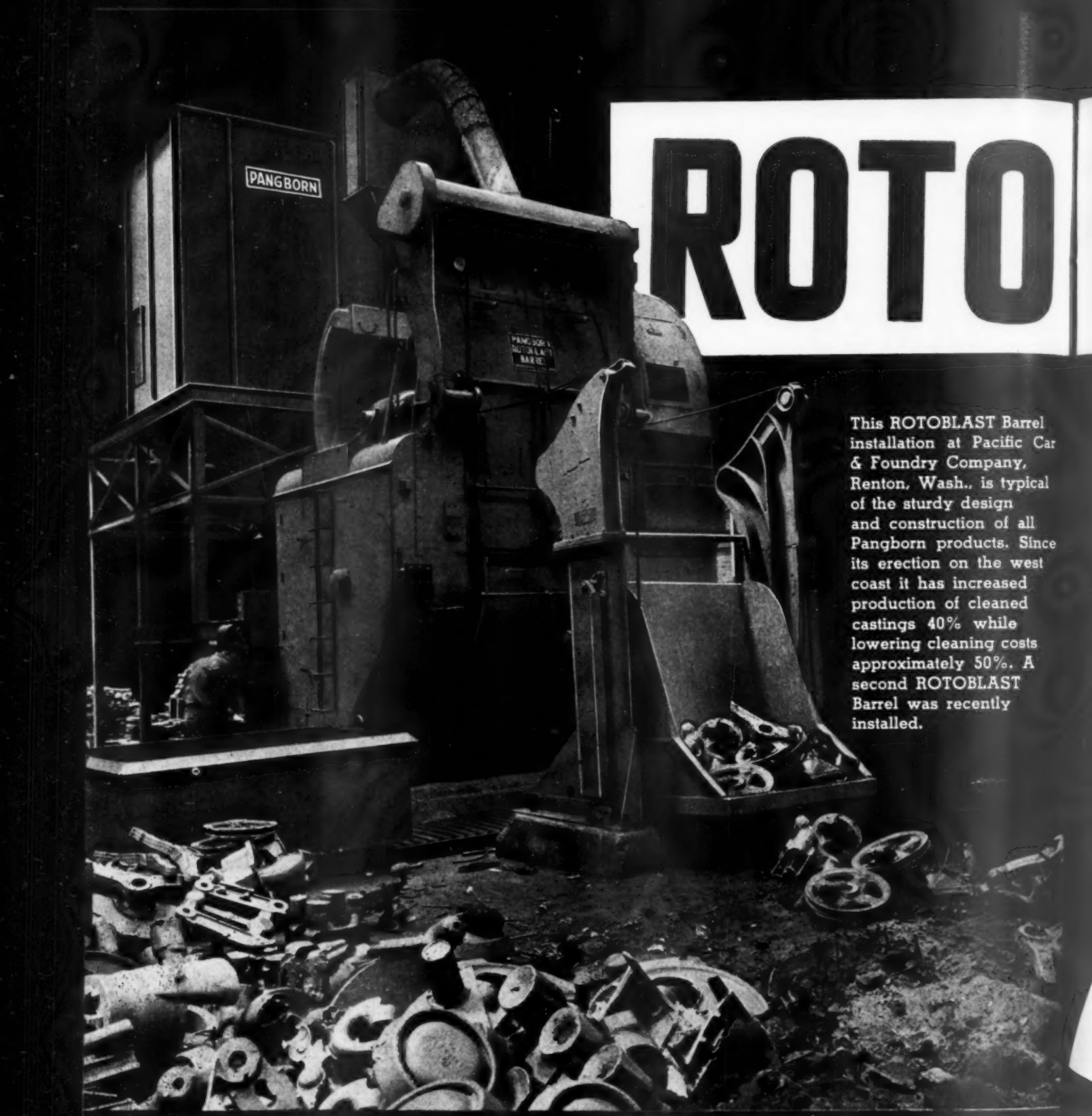
JAMES HUNTER MACHINE COMPANY
NORTH ADAMS MASSACHUSETTS



LINOIL

"I would like to say that the James Hunter Machine Company has used Linoil some twenty odd years and I cannot remember in all that time any complaint ever having been made of core oil of your manufacture. I believe that your manufacturing methods and tests are very effective and I want to compliment you on maintaining consistent quality in your product."— Paul Wilson, Foundry Sup't., James Hunter Machine Co.

SMITH COMPANY
DANIELS - MIDLAND COMPANY)
4690 CLEVELAND 2, OHIO



ROTO

This ROTOBLAST Barrel installation at Pacific Car & Foundry Company, Renton, Wash., is typical of the sturdy design and construction of all Pangborn products. Since its erection on the west coast it has increased production of cleaned castings 40% while lowering cleaning costs approximately 50%. A second ROTOBLAST Barrel was recently installed.

WORLD'S LARGEST MANUFACTURER OF BLAST

PANG

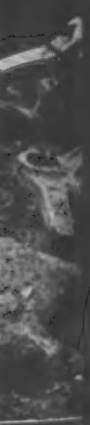
PANGBORN CORPORATION . . . . . .

BLAST

BARRELS
TABLES
CABINETS

arrel
ic Car
y,
ypical

all
Since
west
ed
ed
e
osts
. A
T



for cleaning TOUGH jobs in a BIG way!

The War and its twenty-four-hours-per-day-demand for faster and faster production has proven the steady dependability and worth of the airless ROTOBLAST as an ideal blast cleaning machine for large and small plants.

In the Peace to come, this same ROTOBLAST will take its place as a leader in foundries where castings, forgings, stampings, heat-treated and other metal parts must be cleaned free of scale and sand—QUICKLY—UNIFORMLY—and at LOWEST COST.

Why not prepare now? Come to PANGBORN today for your conversion needs of tomorrow.

Our representatives will come to see you upon request.

Send for copy of our 32 page pocket size Condensed Catalog.

QUALITY PC PRODUCT

PANGBORN
CONDENSED
·CATALOG·

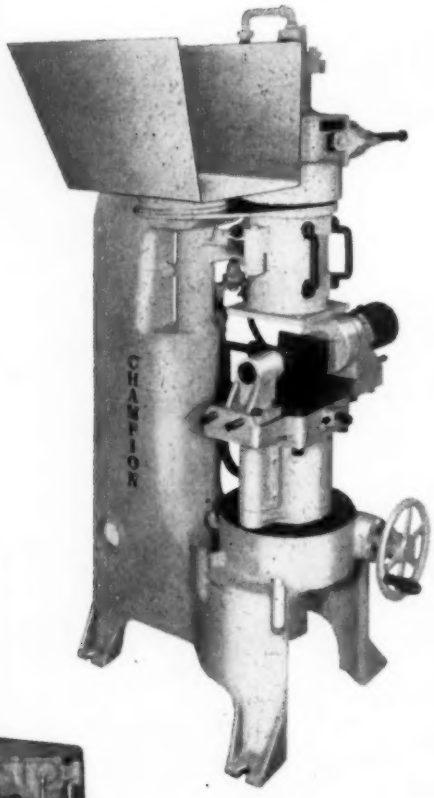
T CLEANING AND DUST CONTROL EQUIPMENT

GBORN

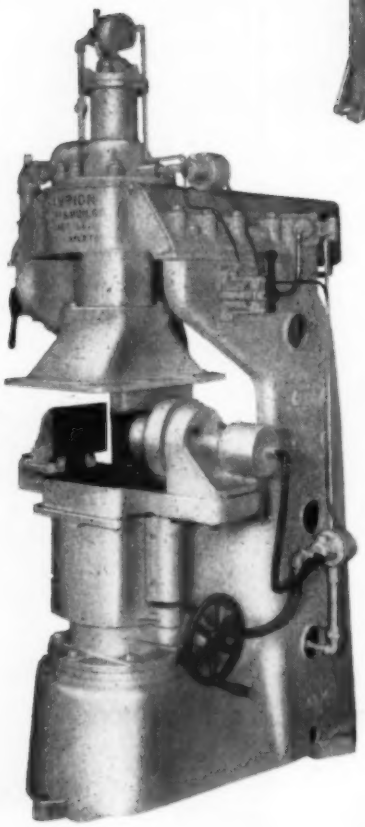
. . . . . HAGERSTOWN, MARYLAND

IF IT'S A QUESTION OF

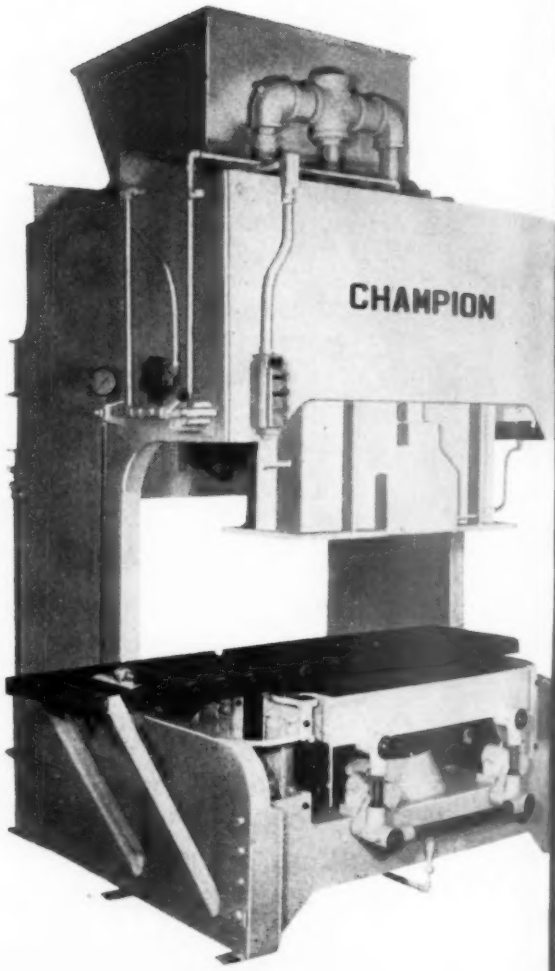
Champion Answers Your Core Ra



Champion Core Blowers
MODEL CB-8



Champion Core Blowers
MODEL CB-12



Champion Core Blowers
MODEL CB-400

CHAMPION FOUNDRY
1318 W. 21st STREET

MORE AND BETTER CORES

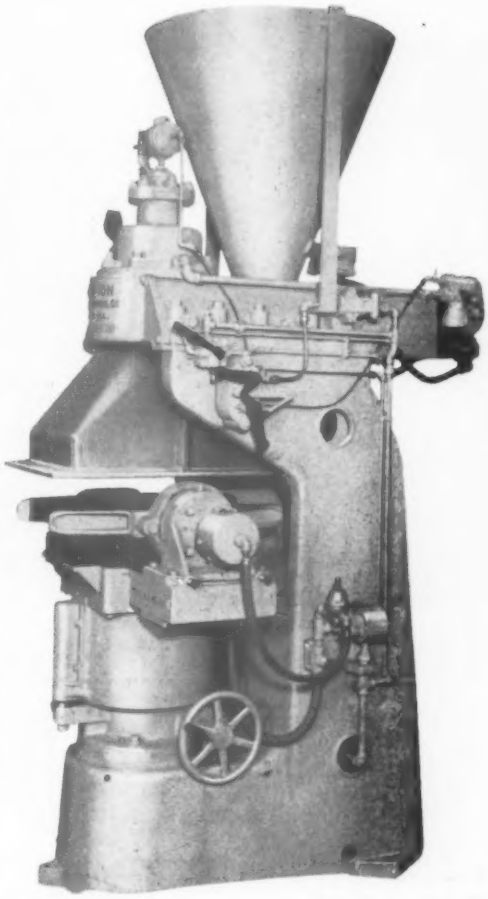
ing Needs With 4 Great Core Blowers

These four great Champions are the result of 47 years experience in the manufacture of foundry equipment. Such lengthy service by practical foundrymen to a single great industry has given us the "know how" to produce *Champion* Core Blowers that the least experienced labor can operate efficiently and economically.

Any man or woman—boy or girl can produce perfectly rammed cores on a *Champion* Core Blower by merely setting the box and pulling the lever. In a single second small or large cores are perfectly rammed. The working table is completely accessible with no obstructions, so that cores are produced faster, more economically and more accurately without need for highly trained labor.

A single valve operates the core box clamp, clamps same against the blow plate, blows the core, exhausts and releases the clamps in the proper cycle. Rigid one-piece, cast steel frame insures accurate alignment of core box and blow plate. Patented Air-Operated Hydraulic Clamp locks the core box securely against split box separation.

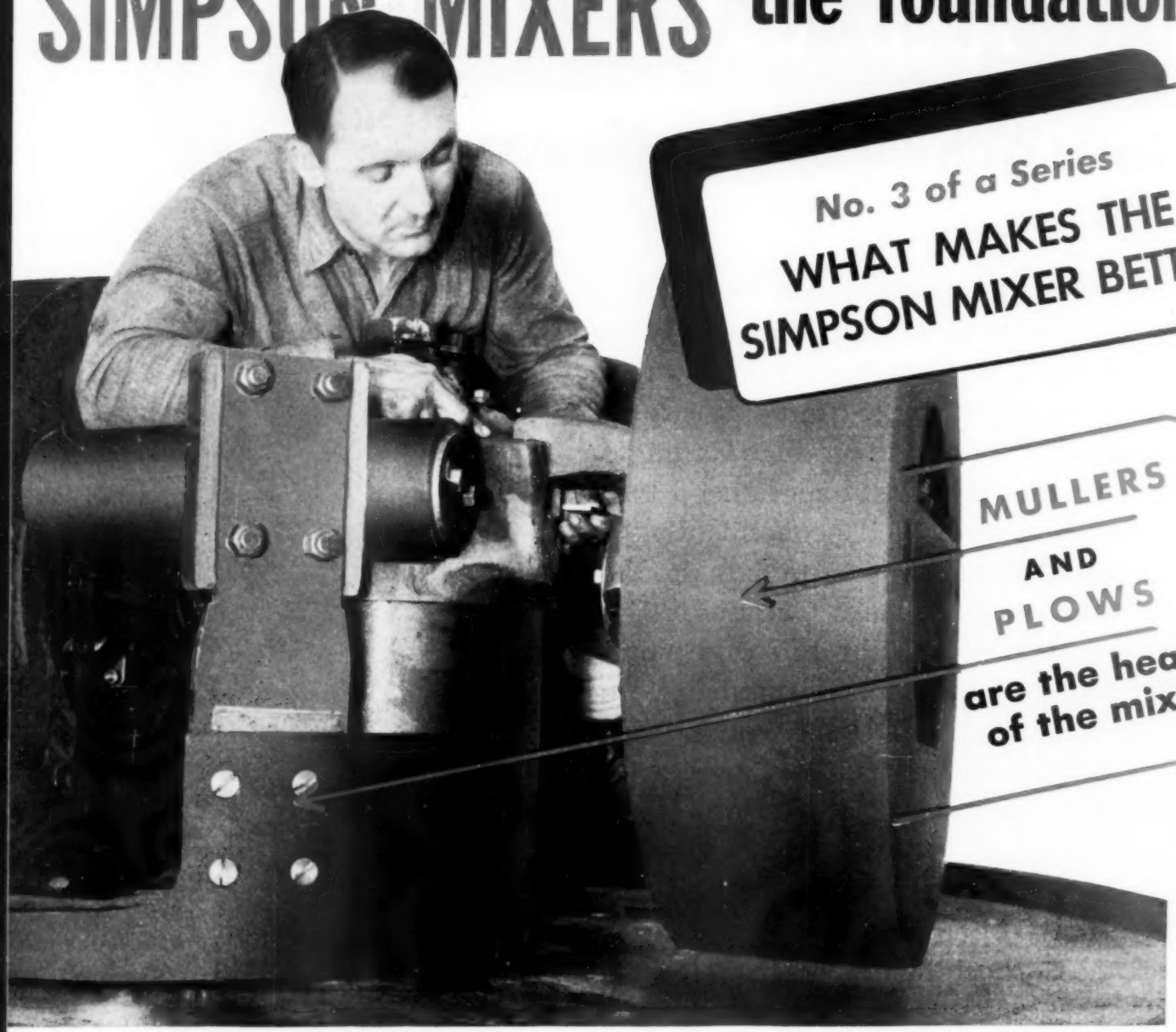
If you are looking for Champion performance, it's merely good judgment to string along with a *Champion*.



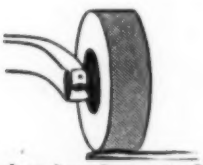
Champion
Core Blowers
MODEL CB-15

ACHINE COMPANY
CHICAGO, 8, ILLINOIS

SIMPSON MIXERS the foundation

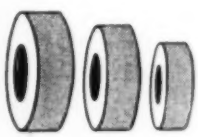


HERE'S WHY SIMPSON MULLERS ARE BETTER



Rocker Arm Prevents Sand from Being Crushed

Rocker arms from which the mullers are suspended allow the mullers to rise and fall depending on the load and material. In this way, the full weight of the wide mullers thoroughly conditions the sand, but does NOT grind it, since the mullers do not run on the pan.



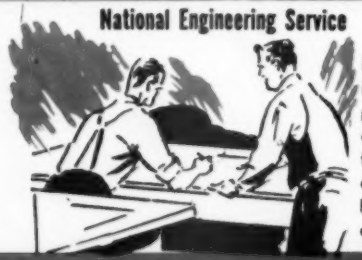
Mullers Easily Changed or Adjusted for Various Types of Sand

Every size Simpson mixer can be had with interchangeable mullers of different weights to meet specific requirements. All foundry sands cannot be treated alike, and to meet varying conditions the mullers can be adjusted from 0" to 4" above the pan.

Long Wearing Mullers Assure Low-Cost Operation

Mullers are made of chilled car wheel iron which has been proved more durable and satisfactory than any other material. These Simpson mullers are guaranteed for at least five years against excessive wear.

National Engineering Service



For more than 30 years National Engineering and Field Service, has helped hundreds of foundries solve problems in sand preparation, reclamation, handling, storage and control. Today, National Engineers are constantly on the job helping foundries with problems of sand handling and control on construction, maintenance, repair or new requirements. National Engineering and Field Service is available and eager to help you whenever and wherever you need it.

National Field Service

of *better sand control* . . .

THERE must be a good reason why four out of every five new mixers installed are Simpsons. Simply stated, that good reason is . . . experienced foundry men *know* . . . that the Simpson mixer produces the maximum capacity of properly prepared sand at the lowest net cost per ton.

Each and every component part of these better mixers has been engineered with the skill gained in 30 years of service to the foundry industry. Each and every part has been tried and tested in our laboratory and in the field.

Let's look at just two parts of this machine—let's look at the mullers and plows—and see what National has done to make them do a better job for you.

The mullers are suspended on rocker arms which allow them to rise and fall depending on the load and material, insuring complete sand conditioning WITHOUT grinding.

These mullers can be easily adjusted or interchanged with ones of different weight for varying sand conditions. The chilled car wheel iron from which they are made has proved so durable that they are guaranteed for a minimum of five years. On all production size mixers, the mullers run on roller bearings. They are specially designed to shed sand.

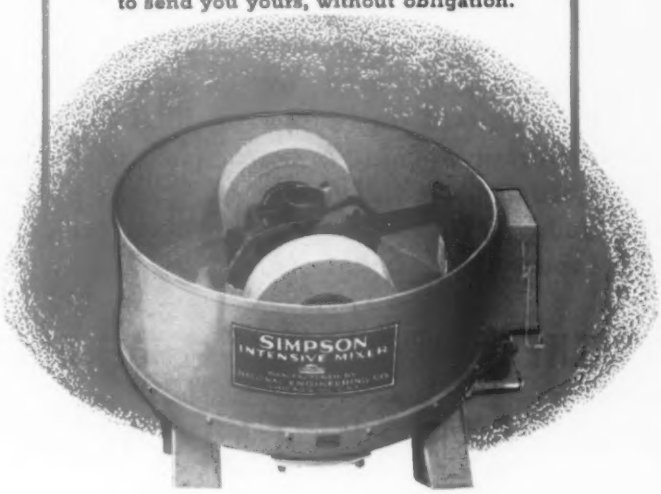
Feeding the sand to the mullers are the plows, and because of the extreme wear they are subjected to, they must be plenty tough. By beading a special NECO metal on these plows, they have been made to stand up for from two to three thousand hours of hard service. Maintenance is simplified by National's policy of supplying NECO metal to Simpson users who can renew worn edges by beading on new metal themselves.

Plows can be easily adjusted in a few minutes to insure efficient operation. The shape of the plows and the fact that they slightly overlap, prevents any sand from being missed by the mullers.

These are just two of the practically-engineered component parts of Simpson mixers. But the engineering skill and experience that has gone into their development to the highest degree of efficiency is characteristic of the thought and workmanship that make Simpson Mixers famous throughout the foundry industry. Here indeed, is your practical, profitable machine for sand conditioning.

WANT THE COMPLETE DETAILS?

The new 64 page Simpson Handbook tells the complete story of better sand control. If you haven't a copy, we'll be delighted to send you yours, without obligation.



AND HERE'S WHY SIMPSON PLOWS ARE BETTER

Easily Adjusted

Slotted holes in the beam and plow strap make it an easy matter to adjust the plows up and down and sideways to maintain the highest operating efficiency at all times.

Insure Complete Conditioning

The two curved plows set the sand up for the smearing and turning of the mullers. The outside plow slightly overlaps the inside one so that no sand is missed—for intensive mulling and rapid discharge.

NECO Metal for Long Life

Plow life has been increased to give from two to three thousand hours of service by beading a new compound called NECO metal on the edge of the plow proper, which is made of heavy carbon steel.

ARMY E NAVY

NATIONAL ENGINEERING COMPANY

MACHINERY HALL BUILDING • CHICAGO 6, ILLINOIS

Manufacturers and Selling Agents for Continental European Countries—The George Fischer Steel & Iron Works, Schaffhausen, Switzerland. For the British Possessions, Excluding Canada and Australia—August's Limited, Halifax, England. For Canada—Dominion Engineering Co., Ltd., Montreal, Canada. For Australia and New Zealand—Gibson, Battle & Co., Pty., Ltd. Sydney, Australia

AN INSTITUTION DEVOTED TO THE SCIENTIFIC DEVELOPMENT OF FOUNDRY PRODUCTS

DELTA

FOUNDRY PRODUCTS

Every DELTA Foundry Product is backed by continuing and exhaustive laboratory research to safeguard quality and maintain absolute uniformity. From raw materials to the finished product manufacturing processes proceed under an automatic and persistent policy of laboratory control.

Modern manufacturing facilities... providing factors of accuracy which exceed human exactness ...eliminate elements of chance and inaccuracy. In fact, every provision is made, in the manufacture of DELTA Foundry Products, to insure user satisfaction through DELTA'S continued leadership in the production of Foundry Products of distinction.

THE COMPLETE LINE OF DELTA FOUNDRY PRODUCTS INCLUDES:

DELTA CORE & MOLD WASHES

Special — Regular — Non-Ferruskoat

Thermokoat (*It's Plasti-Lastic*)

Grakoat — Steelkoat — Blakoat

•

Chemically Active Core & Mold Washes

•

Mudding Compounds

ChillKoat — No-Vein Compounds

CORE OILS AND BINDERS

•

SPRAY BINDERS

•

CORE ROD DIP OILS

•

SAND CONDITIONING OILS

•

LIQUID PARTING

•

PARTEX (Nut Shell Parting)

DELTA OIL PRODUCTS CO.

Manufacturers of

INDUSTRIAL & AUTOMOTIVE OILS, GREASES & COMPOUNDS

MILWAUKEE 9, WISCONSIN

The Royer's Performance Makes It An "Automatic Repeater"!
We only have to sell a Royer once. The way it conditions sand makes the foundry that purchased it a Royer user for all time. Practically every foundry that buys a Royer Sand Separator and Blender buys another when it finally requires replacement or to add to their equipment.
Only the "combing belt" action of the Royer gives them properly mixed, blended and double-aerated sand—only the Royer breaks all of the lumps, removes trash and increases permeability, cutting discount losses.
Ampco Metal, Inc., of Milwaukee, is among the hundreds of foundries that are "automatic repeaters." The first Royer they bought did the job—when increased volume called for additional equipment, they ordered another Royer.
There are more Royers in use than all other makes of sand machines combined—over 3,400 now have been sold. Six portable models, four stationary models, two "lift-about" combination sand separator and scrap remover units—for ferrous and nonferrous jobbing and production foundries.
Let our local representative give you the facts!
AMPCo
THE ROYER
ROYER FOUNDRY & MACHINE CO. KINGSTON PA.
Reproduced from THE FOUNDRY, September, 1941.

The 5th Royer for Ampco Metal, Inc.!

Royer Model "D"; capacity 24 to 30 tons per hour.

Back in 1941, when the advertisement pictured here appeared, Ampco Metal, Inc. of Milwaukee, Wisc.—producers of special nonferrous alloys and parts with remarkable strength and resistance to wear, fatigue and corrosion—had already purchased two Royers.

Since 1941, Ampco Metal has found a growing place in the war effort, and their sand conditioning requirements have increased accordingly. In March, 1942 Ampco installed a Royer Model "C-2", in January, 1943 a Royer Model "D" and in May, 1944 another of the same model, which is shown at the left.

It seems that foundries—ferrous or nonferrous—where the Royer is once put to work are never again satisfied with less thorough and efficient sand conditioning equipment. That's one reason why the number of Royers in service has grown from 5,100 to over 6,100 since the above advertisement was published. Ampco Metal, Inc. is typical of the many foundries that have ordered Royers again and again.

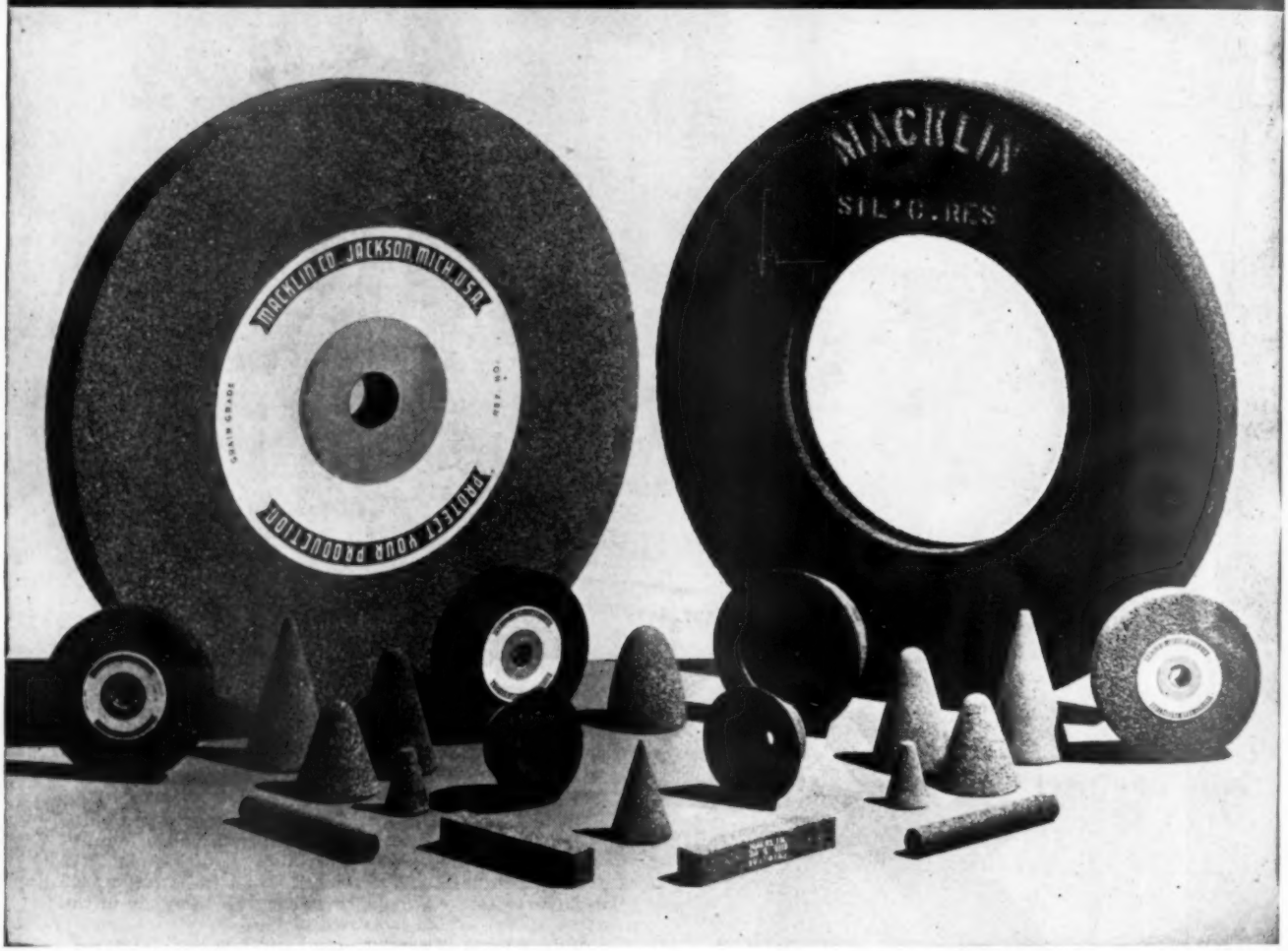
Royers are available in sizes and models for every foundry requirement. Write for new Catalog No. 744, which presents them all.

ROYER FOUNDRY & MACHINE CO.
159 PRINGLE ST., KINGSTON, PA.

THE ROYER FOUNDRY & MACHINE CO. KINGSTON, PENNSYLVANIA

FOREMOST IN SAND CONDITIONING EQUIPMENT

MACKLIN GRINDING WHEELS



FOUNDRIES, large and small, require grinding wheels in many sizes, shapes, grains and grade combinations.

Macklin Company is thoroughly equipped to produce high quality grinding wheels for all foundry requirements.

No matter what your grinding problems may be there is a Macklin wheel to fit the job that will "Protect Your Production."

Ask for the services of a Macklin Field Engineer.

Invest in War Bonds

MACKLIN COMPANY

Manufacturers of GRINDING WHEELS—JACKSON, MICHIGAN, U. S. A.

Distributors in all principal cities

Sales Offices:—Chicago - New York - Detroit - Pittsburgh - Cleveland - Cincinnati - Milwaukee - Philadelphia

Juniata

The UNIVERSAL FOUNDRY SAND

Our 137 ton locomotive facilitates prompt loading from fine, medium and open deposits served by our new 3 mile switch track.

A representative deposit of dry, uniform, high silica Juniata sand.

OUR deposits and facilities at Banksand, Juniata Township, Tuscola County, Michigan are the largest bank sand operations in the United States.

IN MOLDS:

Highly Refractory
Permits Hard Ramming
Gives Sharper Profile
Bonds Adhere Readily
Ideal Facing Sand Base
Rapid Mixing or Mulling
Uniform Grain Distribution

IN CORES:

Free Flowing
Saves Binders
Resists Sagging
Smoother Surface
Highly Permeable
No Metal Penetration
No Clay or Lime Defects

We also own and operate bank sand properties at Wilmot, Michigan, and Lake Cicott, Indiana.

Great Lakes
FOUNDRY SAND COMPANY—DETROIT

MINERS • PROCESSORS • FOUNDRY, METALLURGICAL AND SAND BLAST SERVICE

FOUNDRY SANDS • SILICA SANDS
SHOT — GRIT — BLAST SANDS
REFRACTORIES • BENTONITE
RE-BONDING CLAYS

HANDLE FOUNDRY SAND EASIER

Save Manpower — Speed Production with P&H Single Line Grab Buckets

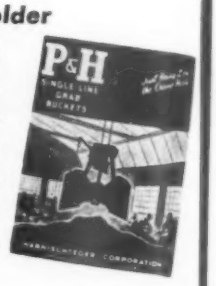
Hang a P&H Single Line Grab Bucket on a regular crane hook and it's ready for service. It works with any crane — without changes in cable reeving — without complicated hook-ups or switch-over delays.

You can whip your manpower problems in a hurry when P&H Single Line Grab Buckets are used for handling sand, refuse, and other foundry materials — for digging pits, filling flasks, etc. They break "bottlenecks" in handling and cut costs as well.

Time-tested features insure perfect balance. Equalized bowl operation results in a full bite at every bite. The P&H patented wedge action trip-lever feature prevents recoil, eliminating shock damage to bucket, cable, and entire hoisting unit. Simplified design and sturdy construction in every detail assure long trouble-free service.

Write for Descriptive Folder

Why P&H Single Line Grab Buckets excel in foundry service is demonstrated in Bulletin C-27, which shows how they are built and how they operate, and gives dimensional data. A copy will be sent on request—no obligation. *Write today.*



"Controlled Discharge"

Cranes for Cupola Charging

Included in the P&H line — America's largest builder of overhead materials handling equipment — are cranes and hoists that permit charging of cupolas at any level for better melting control. . . . Write for information.

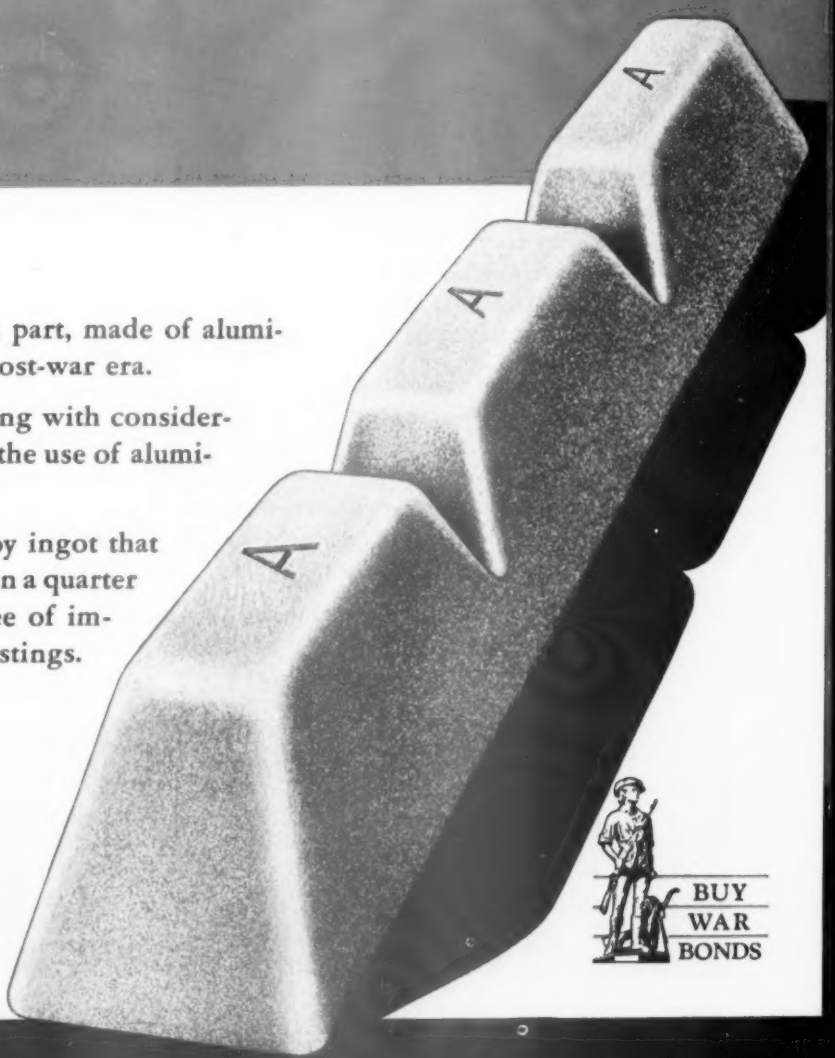
P&H SINGLE LINE GRAB BUCKETS

Gen. Off.: 4405 W. National Ave., Milwaukee 14, Wis.

HARNISCHFEGER CORPORATION

HOISTS · WELDING ELECTRODES · MOTORS · P&H · EXCAVATORS · ELECTRIC CRANES · ARC WELDERS

When Your Ideas Call for Aluminum



The range of products, either entirely or in part, made of aluminum is going to be vastly increased in the post-war era.

Lightness combined with great strength, along with considerable eye-appeal—hence sales appeal—dictate the use of aluminum to a greater degree than ever before.

Aluminum Refiners produces aluminum alloy ingot that will exactly meet your specifications. More than a quarter of a century of experience assures ingot free of impurities, enabling you to turn out perfect castings.

Aluminum Refiners

Division of BOHN ALUMINUM & BRASS CORPORATION • *General Offices—Lafayette Building* • Detroit 26, Michigan

MANUFACTURERS OF ALL TYPES AND SHAPES OF CASTING AND DEOXIDIZING ALLOYS

A pioneer producer of

GRINDING WHEELS

makes a promise to industry

THE WIDE and ever-growing industrial acceptance of Peninsular Grinding Wheels can be measured by the fact that today more than 50 diversified fields are represented among the hundreds of manufacturers who depend wholly or partially on Peninsular.

True to a tradition that dates back to 1889, Peninsular has kept pace with every new development in the engineering, manufacture and application of grinding wheels — and in addition, Peninsular has pioneered many new and valuable contributions, both in abrasive wheels and in the machinery for their manufacture.

Today, as America stands on the threshold of reconversion to civilian production, Peninsular renews its promise to industry—to build only to the highest standards of quality and engineering excellence.

A STANDING INVITATION

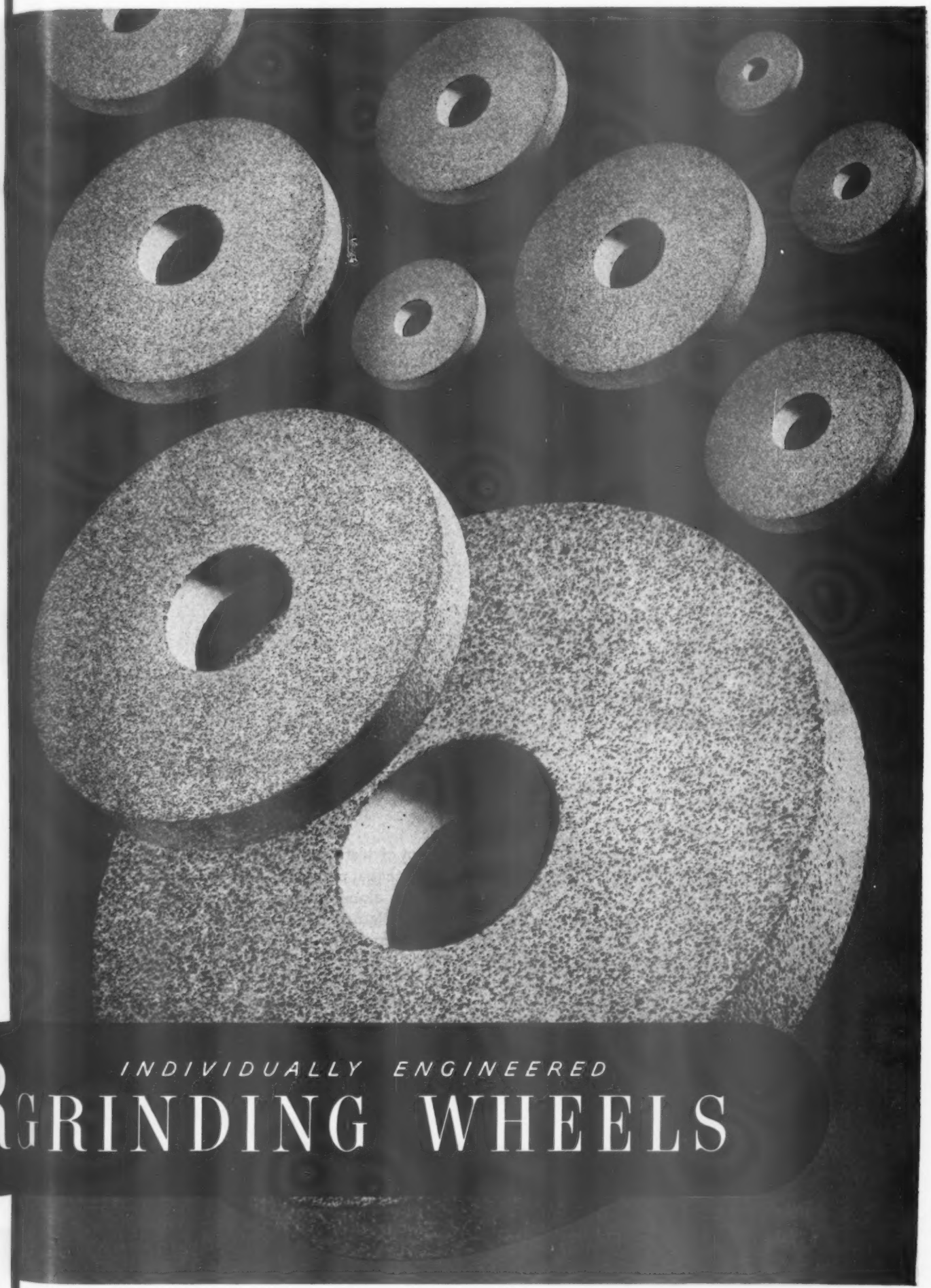
Our expert staff of factory and field engineers are ready today to help in your postwar preparation—with a production, engineering and cost analysis service beyond any offered up to now in the industry.

The Peninsular Grinding Wheel Company, 729 Meldrum Ave., Detroit 7, Michigan. *Branch Offices:* Chicago, Cleveland, Newark, Pittsburgh.

SPECIALISTS IN RESINOID BONDED WHEELS

PENINSULAR G

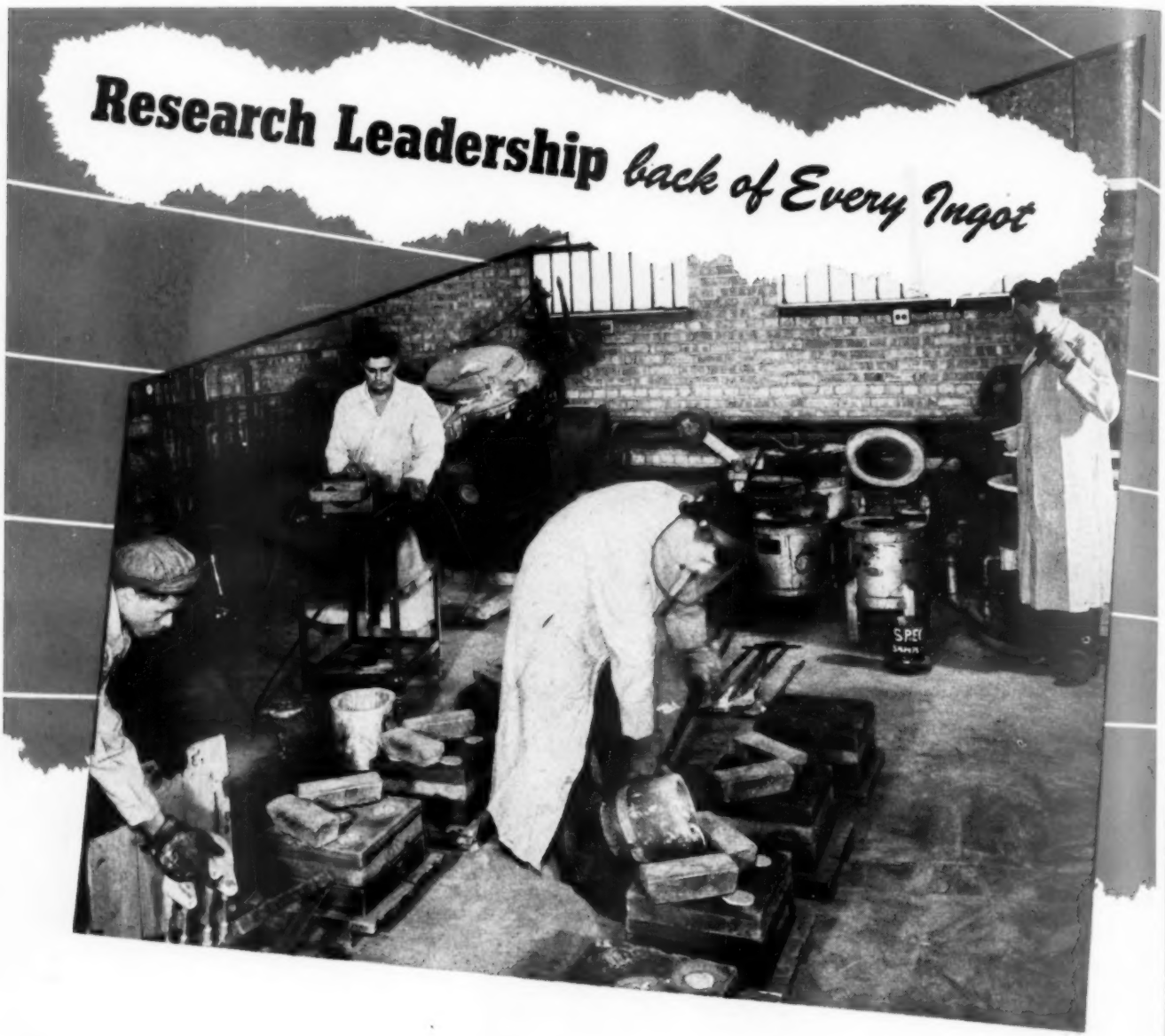
SINCE 1889



INDIVIDUALLY ENGINEERED

GRINDING WHEELS

Research Leadership *back of Every Ingot*

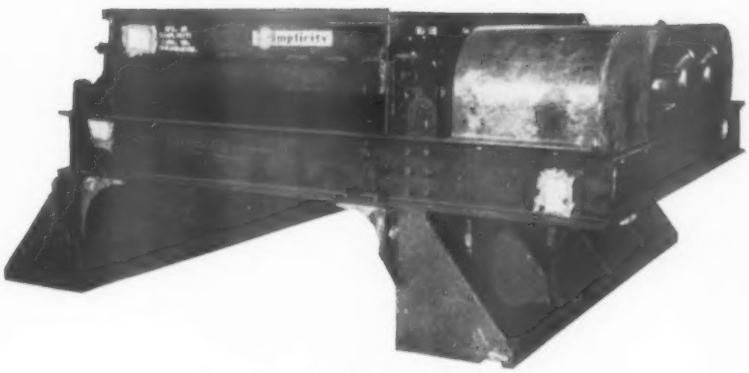


The preparation of test bars is only one step in the extensive research that pre-determines the exact specifications of Apex aluminum and magnesium alloys. The knowledge obtained from tests made with these bars governs the condition under which the alloy will be made to fit your particular requirements. This, with close laboratory control of every step in its production and regulation of the properties, is part of Apex research leadership that is back of every ingot.

APEX SMELTING

Company • *Chicago 12, Illinois*

Simplicity
FOUNDRY EQUIPMENT



Portable 5′ x 8′ Dual Shake-out

PORTABLE SHAKE-OUTS

Many shops without conveyor systems cannot sacrifice production for the time required for such installations. The answer to this problem is to mount the Simplicity Shake-Out on I-beams or castings, like shown in the illustration, and use it as a portable unit. This gives at once the many advantages of speedier production with its saving in labor, flasks and general operating costs. The same shake-out can always be installed later in a permanent location. Many Simplicity Shake-Outs are being used as portable units, some mounted as shown, and others mounted on wheels. The largest portable shake-out is a Quad Unit on a car, which shakes out 150,000 lb. flasks.

PORTABLE SAND SCREENING UNITS

It is recognized that properly prepared sand is vital to securing good castings with a minimum loss. The shop desiring such prepared sand can use a Simplicity Sand Screen in their system. Where no system is available, the 2′ x 3′ Portable Screening and Conditioning Unit is being used with very great success to handle heap sand and the discharge from mullers. Where a greater capacity is desired, the 3′ x 6′ Semi-portable Unit has no equal in the work it will do. This unit is moved around the shop with a crane and fed with a clam shell. In both the 2′ x 3′ and 3′ x 6′ Simplicity units, the sand is screened through a fine mesh screen cloth, the lumps broken up by the breaker, the scrap and impurities removed, and the sand thoroughly conditioned, with the moisture evenly blended by the action of the screen and by the blades of the sand throwing unit, as they cut through the stream of sand and throw it out in a fluffy condition ready for the moulders. Users of these units report obtaining the finest sand ever secured.

Our recommendations are based upon experience gained from over 1600 operating units in various type foundries. Every Simplicity unit is fully guaranteed for the service for which it was recommended.

2′ x 3′ Portable Screening and Aerating Unit

Simplicity Engineering Company

DURAND, MICHIGAN

For Canada: Waterous Limited, Brantford, Ontario

Automatic SAFETY SHUTOFF VALVES by NORTH AMERICAN for Gas or Oil

DANGER

Will your operator remember to SHUT OFF FUEL VALVE when the AIR SUPPLY FAILS

SAFETY

You can be safe by installing a NORTH AMERICAN AUTOMATIC SAFETY SHUTOFF VALVE

FIRE PREVENTION

Reduces your INSURANCE RATE

NORTH AMERICAN
SAFETY SHUTOFF VALVES
WILL CLOSE FUEL SUPPLY

●

WHENEVER
ANYONE SHUTS OFF AIR SUPPLY

●

WHENEVER
FUEL OR AIR PRESSURE FAILS

●

WHENEVER POWER FAILS

★

ONCE CLOSED THE VALVE MUST BE RESET MANUALLY, GIVING THE OPERATOR TIME TO CHECK THE TROUBLE AND PREPARE FOR PROPER RELIGHTING OF BURNERS

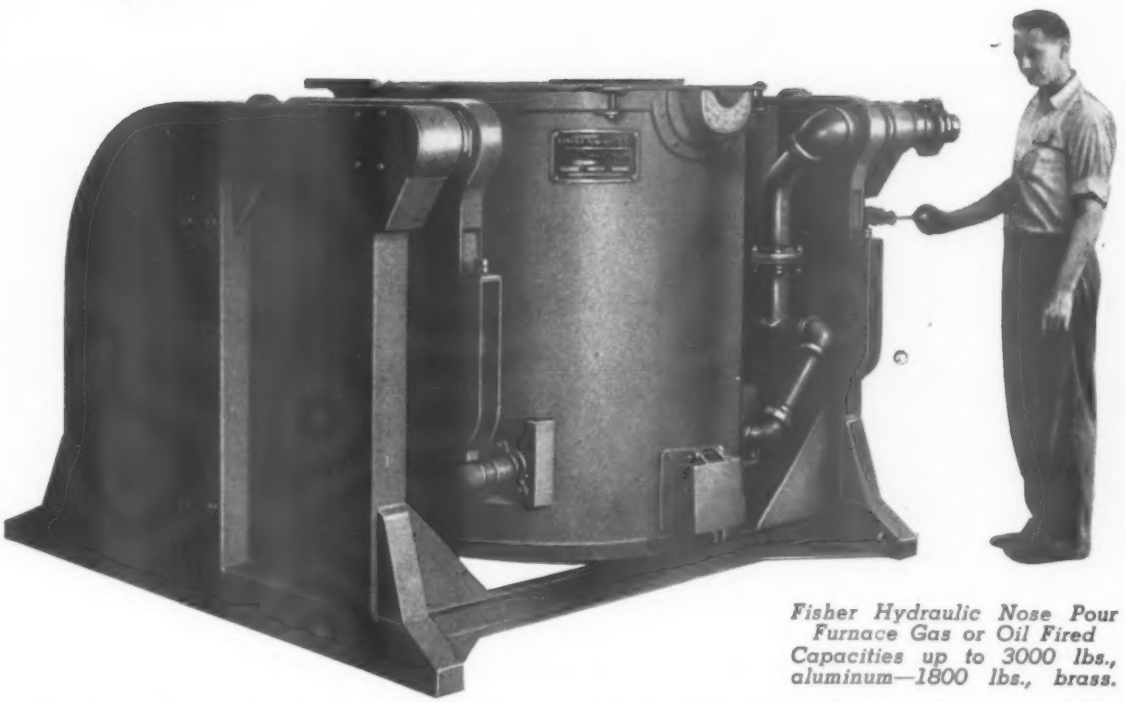
★

SIMPLE COMPACT DESIGN GUARANTEES DEPENDABLE OPERATION

THE NORTH AMERICAN MANUFACTURING COMPANY
MANUFACTURERS OF INDUSTRIAL FUEL BURNING EQUIPMENT FOR GAS OR OIL
BRANCH OFFICES *with* FIELD ENGINEERS *in* PRINCIPAL CITIES
CLEVELAND 4, OHIO

Look to FISHER

for proven metal melting answers



Fisher Hydraulic Nose Pour Furnace Gas or Oil Fired Capacities up to 3000 lbs., aluminum—1800 lbs., brass.

Compactness, fuel economy, production efficiency and construction, with promise of above average service years, are certain to be leading requisites of metal melting equipment when the good old American custom of competition returns. These requisites can only be made realities through experience carefully blended with engineering ingenuity and facts. Fisher's scentific pioneering of melting equipment for every branch of the light metal field, for many years is evident in the "HNP" Furnace illustrated. The "HNP" is designed to fully satisfy the practices that have been so decidedly changed in the past few years, embodying the advantages of compactness, fuel economy, production efficiency and rugged construction. This type furnace is widely used for melt-down, for hot charging other furnaces, for permanent mold and die casting work, as well as regular melting. Consult Fisher for a scientific answer to any and all metal melting requirements.

Request Bulletin No. 550 showing complete Fisher Line in brief.

5519 N. WOLCOTT AVENUE, CHICAGO 40, ILLINOIS

Fisher FURNACE COMPANY

Engineers and Manufacturers

IT TAKES MORE THAN GOOD METALS

TO MAKE *Sipi Quality* .....

Above all, it requires the determination to make only the best. Then . . . it takes knowledge . . . years of experience in actually producing alloys of the highest quality. Finally, it calls for research—continuous and unhampered—by men provided with modern equipment and skilled in both laboratory and plant technique. These . . . plus selected materials . . . are priceless ingredients of SIPI Alloys.

Silverstein and Pinsof

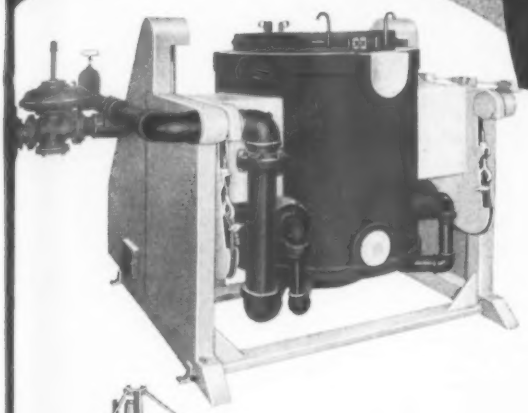
INCORPORATED

1720 ELSTON AVENUE CHICAGO 22, ILLINOIS

BRASS • BRONZE • ALUMINUM • LEAD • TIN • SOLDER • TYPE METALS • BABBITT • ZINC BASE ALLOYS

STANDOUTS

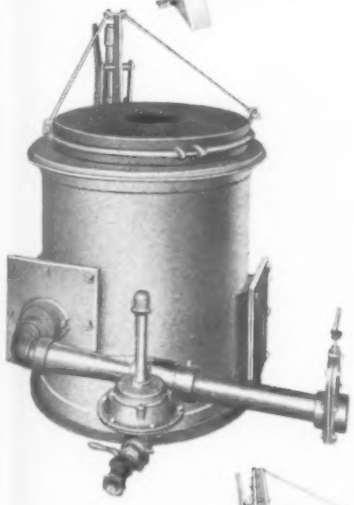
On the Production Line!



STROMAN MECHANICAL TILT CRUCIBLE MELTING FURNACES

For Brass, Bronze, Aluminum and other Non-ferrous Metals

These great furnaces, mechanically tilted, include such features as the famous Stroman Stationary Lip Pour, which allows the ladle to remain in the same position during the entire pour . . . Finger-Tip Tilting Control . . . Push-Back Cover . . . Advanced Safety Features . . . Oil or Gas Fire . . . and many others. They are built in 150 to 400 crucible sizes. Send for Bulletin No. 44 for further information.



STROMAN GAS FIRED FURNACE

For Brass, Bronze and Aluminum

These furnaces are equipped with proportional mixers which automatically control the correct amount of air and gas flow to the burners. This results in the correct furnace atmosphere so necessary in the melting of Brass alloys. It also assures utmost fuel economy. This furnace may also be had with oil fire. Bulletin No. 52 explains in detail. Send for it now.

STROMAN MANUAL TILT CRUCIBLE MELTING FURNACES

For Brass, Bronze and Aluminum

These furnaces are most modern in design . . . Handle from No 40 to No. 400 Crucible . . . Can be fired by either gas or oil . . . Have Swing Type Cover . . . and their welded steel construction and correct insulation assure long life. Specifications will be sent at once upon request of Bulletin No. 52.

STROMAN IRON POT MELTING FURNACES

For Aluminum, Zinc, Lead ond other White Metal Alloys

These are excellent break down or holding furnaces for use in either foundries or die casting plants. They are built to any desired size and may be fired by either gas or oil. Construction allows for ample combustion space to prevent impingement of flame on pot. These furnaces are also supplied with hoods which collect and exhaust fumes and products of combustion. Your request for Bulletin No. 63 will bring full information.

Remember - - -

Stroman makes furnaces for melting all types of non-ferrous metals . . . so bring your foundry layout and metal melting problems to them . . . their engineers are qualified authorities of long standing on these subjects and will gladly analyze your problems and offer many helpful suggestions.

STROMAN FURNACE & ENGINEERING CO.

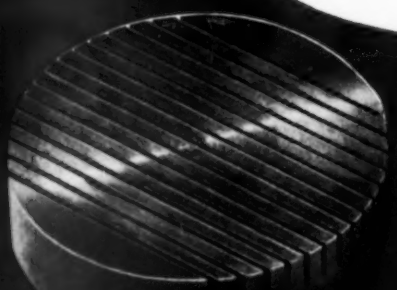
DIVISION OF

THE PETERSEN OVEN CO. 300 W. ADAMS ST. CHICAGO 6

SMILLIE

Continues Leadership in

THE PRODUCTION OF



CORE BOX VENTS

It is with justifiable pride that C. M. Smillie & Co. points to its sustained leadership in the manufacture of Core Box Vents. Smillie vents have proven their worth in many foundries where they are accepted as standard equipment. Made of brass, Smillie Core Box Vents are .093 deep at the head, allowing the vent to be machined to fit any contour without being removed from the plate. Sizes are available from $\frac{1}{8}$" to $1\frac{1}{4}$" in $\frac{1}{16}$" steps. Foundrymen who are troubled with drops, pockets or uneven contours will find Smillie vents the right solution to their problems. Smillie vents assure greater performance—longer life.

WRITE FOR FULL INFORMATION NOW.

C. M. SMILLIE & CO.

Smooth POWER

FOR FAST, ACCURATE DRILLING

Thor AIR DRILLS

To speed your hardest shop drilling jobs Thor Air Drills have *power* and plenty of it. It's *smooth* power, too, the smooth power that makes drilling highly accurate and precise . . . that gets the job done *right* as well as fast.

You get that smooth power with Thor Air Drills because Thor's compact, one-piece construction of rotor and shaft provides deeper blade slots and wider blades . . . to deliver power in a steady, even flow.

What's more, aluminum cylinders and malleable iron housings reduce both the size and weight of Thor drills. And they have a speed governor that controls and *minimizes* air consumption . . . automatic lubrication . . . heavy duty bearings . . . and triple gearing for greater torque reserve.

For helpful information on the complete line of Thor Air Tools for all shop work, send for Thor catalog 52B.

WHY YOU GET *Smooth* POWER WITH *Thor* AIR DRILLS

Thor's one-piece construction of rotor and shaft, shown here, provides deeper blade slots and wider blades to give a *smooth* flow of power for faster, more accurate drilling.

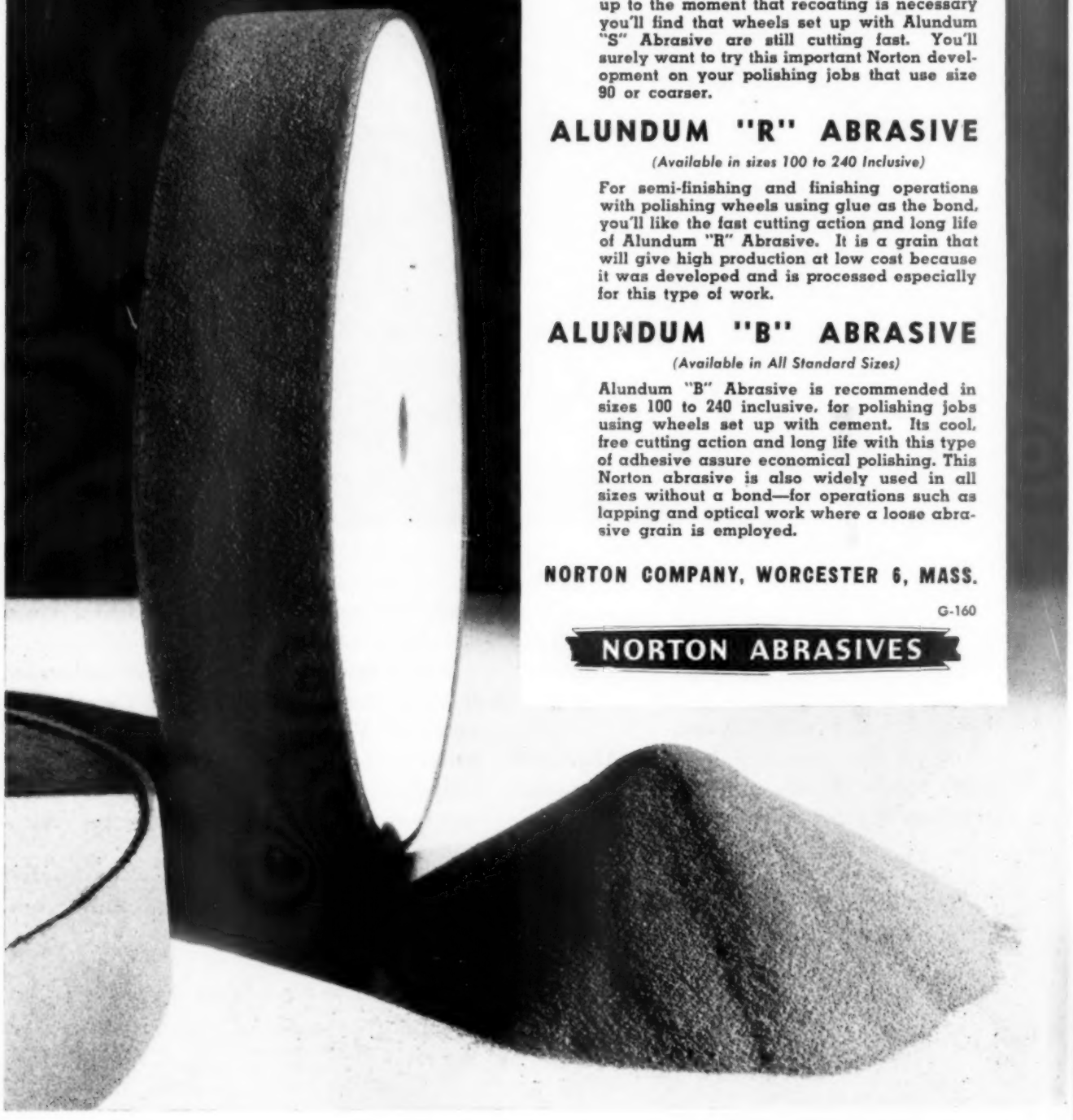
Thor *Portable Pneumatic and Electric Tools*

INDEPENDENT PNEUMATIC TOOL COMPANY

600 W. JACKSON BOULEVARD, CHICAGO, ILL.

Branches in Principal Cities

The Right Type of Abrasive for Every Polishing Job...



ALUNDUM "S" ABRASIVE

(Available in sizes 90 and Coarser)

This Norton abrasive has proved outstandingly successful in the field. Not only does its special surface treatment give grains with better sticking power but also a faster cutting action—and a cutting action that lasts. Right up to the moment that recoating is necessary you'll find that wheels set up with Alundum "S" Abrasive are still cutting fast. You'll surely want to try this important Norton development on your polishing jobs that use size 90 or coarser.

ALUNDUM "R" ABRASIVE

(Available in sizes 100 to 240 Inclusive)

For semi-finishing and finishing operations with polishing wheels using glue as the bond, you'll like the fast cutting action and long life of Alundum "R" Abrasive. It is a grain that will give high production at low cost because it was developed and is processed especially for this type of work.

ALUNDUM "B" ABRASIVE

(Available in All Standard Sizes)

Alundum "B" Abrasive is recommended in sizes 100 to 240 inclusive, for polishing jobs using wheels set up with cement. Its cool, free cutting action and long life with this type of adhesive assure economical polishing. This Norton abrasive is also widely used in all sizes without a bond—for operations such as lapping and optical work where a loose abrasive grain is employed.

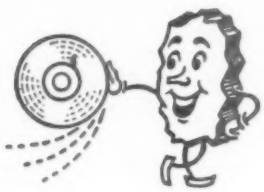
NORTON COMPANY, WORCESTER 6, MASS.

G-160

NORTON ABRASIVES

When you use SM Ferrochrome as a ladle addition to cast iron

You get these advantages of chromium:



. . . improved wear resistance

. . . increased resistance to heat

. . . better physical properties

---

and at less cost

than with ordinary ferrochrome, because SM Ferrochrome gives higher chromium recoveries. Since it dissolves faster than ordinary ferrochrome:

. . . larger ladle additions of chromium are possible
. . . chromium is evenly distributed throughout the metal
. . . formation of hard spots is prevented.

If you are making chromium cast iron, you will find SM Ferrochrome economical and reliable. If you wish further information on this alloy, write for the booklet, "Chromium in Cast Iron."

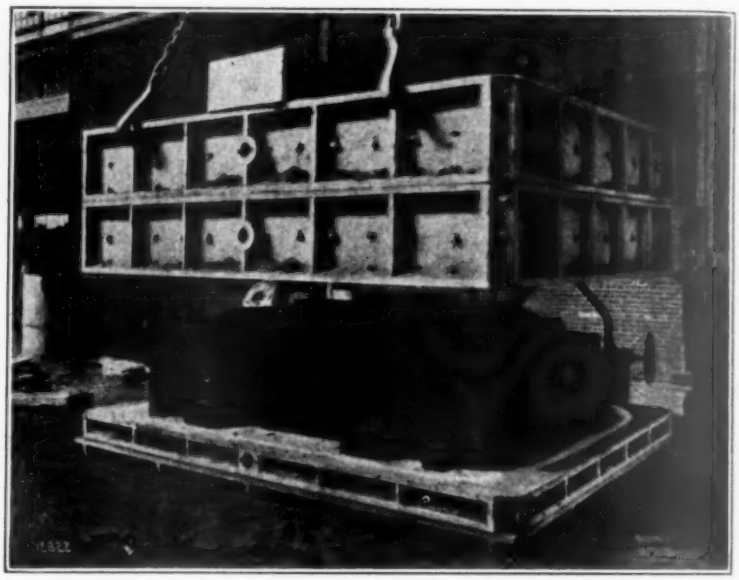
ELECTRO METALLURGICAL COMPANY
Unit of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.
In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario

Electromet
Trade Mark
Ferro-Alloys & Metals

"Electromet" and "SM" are trade-marks of Electro Metallurgical Company.

Vulcan Blacking

for ALL sizes of cores and molds



Vulcan Blacking is an insulator between hot metal and sand. It provides a smooth surface for metal to form against, improving casting surface and reducing cleaning costs.

"VULCAN" is a famous Blacking. It has performed well for 50 years, daily insulating thousands of tons of castings, including motor frames, automotive castings, fittings, farm implements, oil field castings, machine tools, Diesel engines, turbine castings, hydraulic presses, etc.

No job too big for VULCAN—and none too small.

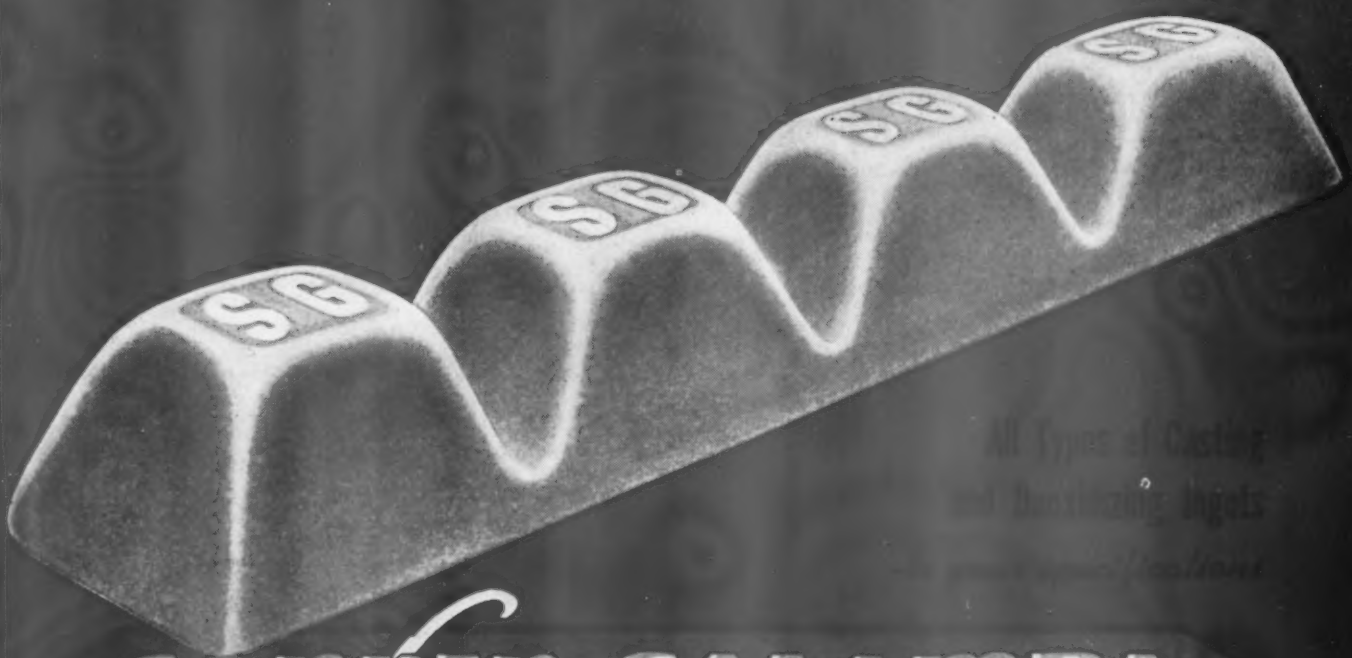
Today, Vulcan Blacking is adjusted to suit your sand, your method of application, drying conditions and type of castings.

Our thanks to the many foundrymen using "VULCAN". Our invitation to those who do not.

VULCAN BLACKING IS MADE ONLY BY

J. S. McCORMICK CO.
PITTSBURGH, PA.

Specify S-G Aluminum ALLOY INGOT



All Types of Castings
and Aluminum Ingots

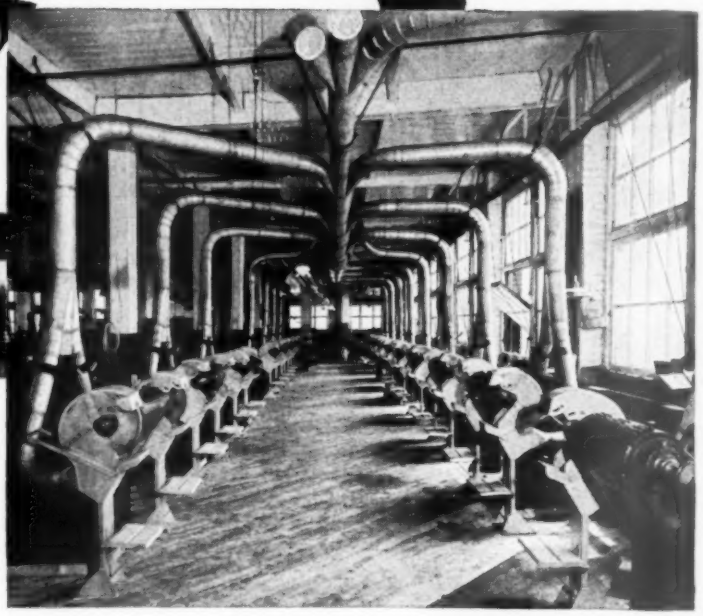
SONKEN-GALAMBA
Corporation

(MEMBER ALUMINUM RESEARCH INSTITUTE)

Riverview at 2nd Street • Kansas City, 18, Kansas

KIRK & BLUM DUST CONTROL SYSTEM

SUPPLANTS *TWO* PREVIOUSLY USED *SYSTEMS*



This system collects heavy dust from 32 double grinders, involving 64 wheels used for polishing operations, for a large manufacturer of wrenches and other hand tools.

Kirk & Blum engineers, after a thorough survey, designed a dust control system that not only solved the present problem but made provisions for future requirements.

Specially designed hoods offer operators a maximum of adjustments and also trap undesirable articles that might get into the system. A special foot rest adjustable to height above floor is also provided as part of the hood design.

Uniformity of suction is maintained by correct design of piping and streamlined fittings so as to produce the correct suction at each hood with a minimum use of power.

Get the unbiased counsel and planning of experts — Kirk & Blum Engineers— and you will get a dust control system that is right. For further details write to

Send for any of the following Booklets:

"Dust Collecting Systems in Metal Industries"

"Fan Systems for Various Industries"

"Blower Systems for Woodworking Plants"

"Industrial Ovens"

"Cooling Systems for the Glass Industry"

The KIRK & BLUM Manufacturing Co.

2808 SPRING GROVE AVE. CINCINNATI 25, OHIO

Tolerance... 1/1000 of an Inch

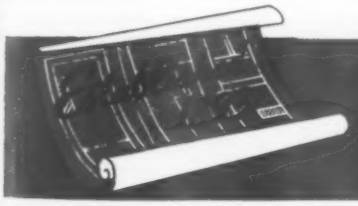
Destination TOKYO

Buffalo
PRECISION PATTERNS
BACK THE
FLIGHT TO VICTORY

Precision Patterns—patterns accurate to one thousandth of an inch. It is skill of this calibre that gives America's air might its "victory punch."

Buffalo Pattern Works with its fifty years of experience in pattern making is now serving leading warplane makers by translating blue prints into precision patterns that enable speedy production of the most intricate castings—castings that meet severest specifications for close tolerances and metallurgical soundness.

Consult Buffalo on your most difficult pattern problems, present or post-war. Write or wire Dept. C.



BUFFALO PATTERN WORKS
830 Hertel Ave. Buffalo 16, N. Y.

TOP FLIGHT PERFORMANCE!

Whatever the grinding purpose may be, ABRASIVE COMPANY GRINDING WHEELS deliver Top Flight Performance. If you're looking for *improved* results in uniformity, economy and longer wheel life . . . if your job, or jobs, are listed below . . . then we cordially invite you to investigate ABRASIVE COMPANY PRODUCTS. Write for FREE Data Book—120 pages of interesting information on modern grinding.

Wheels, Discs, Segments, Grain, Mounted Points for

Internal Grinding	Cylindrical Grinding	Surfacing
Tool and Cutter Grinding	Roll Grinding	Snagging
Centerless Grinding	General Purpose Grinding	Cutting-Off

COMMANDING QUALITY · · · OUTSTANDING RESULTS!

ABRASIVE COMPANY

DIVISION OF SIMONDS SAW AND STEEL CO.

TACONY & FRALEY STS., PHILADELPHIA, PA. • DISTRIBUTORS IN ALL PRINCIPAL CITIES

From Pigs to Pots to Parts in Volume–on Schedule

. . . The E-P Man Knows Foundries—will help with Plans now to Transport your Bigger Loads Faster —More Safely—For Less

LOADS on a fleet of Elwell-Parker Trucks move like clockwork in this great non-ferrous project:—

Pigs or ingots—foundry supplies of many kinds—pots and other equipment—castings through cleaning, machining and storage, delivered on multiple skids to outgoing motor trucks.

Urgent war production makes scheduled speed imperative now. Tomorrow, Elwell-Parkers will continue to keep big-volume loads moving swiftly and safely, at low cost.

Equip your Foundry now to meet new competition ahead—transport bigger Unit Loads without waste. Elwell-Parker can help you to build a modern material-handling System around your present Foundry layout—to redesign your loads for mechanical transportation—reduce your costs—increase your net.

Profit by Specialized Foundry Experience covering more than 30 years. For a survey and complete recommendations, dial the E-P Man—or wire us for the address of the Field Engineer in an "Elwell-Parker City" near you.

The Elwell-Parker Electric Company, 4220 St. Clair Avenue, Cleveland 14, Ohio.

ELWELL-PARKER

POWER INDUSTRIAL TRUCKS

CARRY CORES UP TO 1200 LBS. WITHOUT DEFLECTION!

Note the reenforcing construction used on this typical large plate. The arc welded frame gives rigidity, strength and eliminates deflection.

IT IS BEING DONE ON DIAMOND REENFORCED STEEL CORE PLATES

These special core plates are designed to carry large cores up to 1200 lbs., cores of any size, without deflection or warping.

You may obtain Diamond Core Plates to suit your own special requirements. They are furnished with or without perforations and in all smaller, standard sizes—plain or reenforced as indicated by your needs.

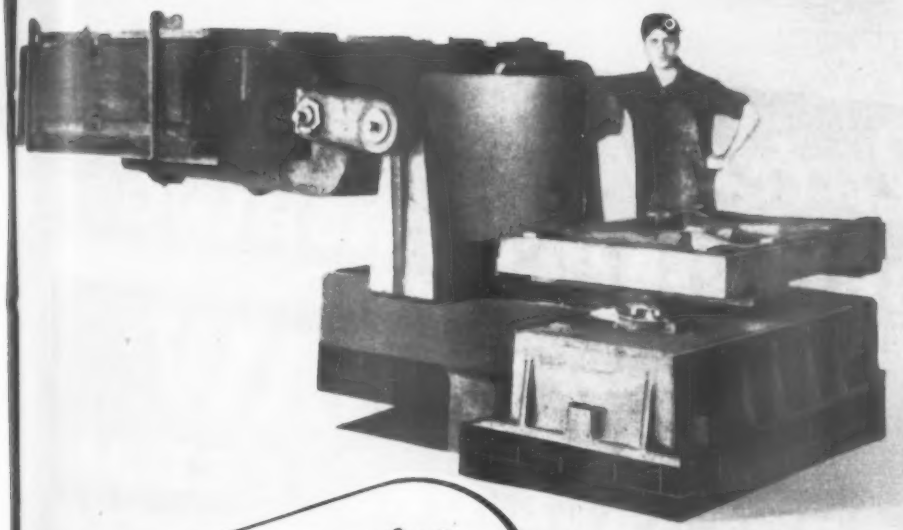
Send us detailed information on your core baking problem and we'll be glad to design a plate to handle the job. Weight of core and dimensions, in particular.

DIAMOND

CLAMP AND FLASK COMPANY

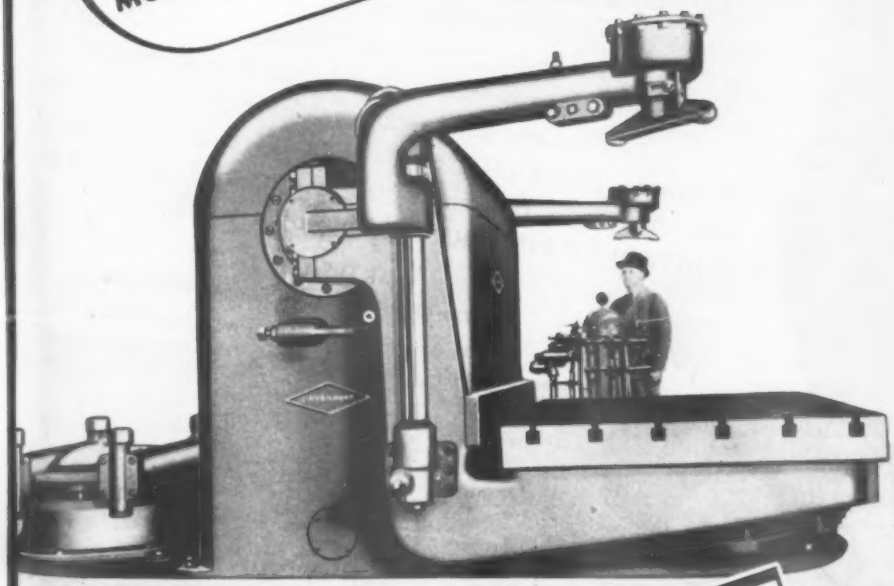
Telephone 2553 **Richmond, Indiana**

Designers of **CORE PLATES, JACKETS, BANDS, FLASKS** *since 1889*



Forty Years Ago

DAVENPORT MOLDING MACHINES WERE CONSIDERED MODERN



Today

DAVENPORT MOLDING MACHINES ARE MODERN

day for your foundry, it must be modern to
of modern business.
nport engineers have kept pace with the
rt is recognized as the standard by which
d. Write for our latest catalog. Let us tell
n 1945 Davenport Molding Machine. You

Y COMPANY

IOWA, U.S.A.

nent Ltd., Toronto and Montreal

FOR *Quicker* SHAPING, GRINDING, POLISHING

USE SKILSAW PORTABLE GRINDERS!

• SKILSAW PORTABLE GRINDERS deliver *top load speed,* even when the going is toughest. That's why they grind down beads, studs and fins faster . . . speed up shaping, buffing and polishing. They're quality-built throughout, with many superior features such as special ball-bearing inserts to absorb vibration and spindle thrust. That's why SKILSAW PORTABLE GRINDERS run smoother, cooler, and last longer.

You'll save time, money and manpower with SKILSAW PORTABLE GRINDERS on every finishing job. Ask your distributor to demonstrate SKILSAW PORTABLE GRINDERS on your own work.

SKILSAW, INC.
5033-43 Elston Avenue, Chicago 30, Illinois
Sales and Service Branches in All Principal Cities

SKILSAW PORTABLE ELECTRIC TOOLS
MAKE AMERICA'S HANDS MORE PRODUCTIVE

ARE YOU REALIZING YOUR MAXIMUM FOUNDRY OUTPUT?

The man who's "Always at Your Elbow" can tell you

Many foundrymen have been surprised after a visit by the Republic Pig Iron Metallurgist. It was news to them that what they regarded as their maximum production was well below the actual potential output of their foundries.

It has likewise been found that many foundries are realizing their true maximum production. But in all cases it is a rare occasion when a foundry has not profited substantially by a visit from the Republic Pig Iron Metallurgist.

This man knows his irons—how and why they should melt, pour and produce castings on a profitable basis. He knows foundry methods and how to adapt them to realize maximum output under each individual group of conditions.

You'll like him because he speaks the language of a practical foundryman. He's ready to step into your foundry when you're having trouble, or what's even more important—to prevent trouble. Let us know when you'd like him to call. And remember, the only obligation is his—and that, to help you.

REPUBLIC STEEL CORPORATION
GENERAL OFFICES • CLEVELAND 1, OHIO
Berger Manufacturing Division • Culvert Division
Niles Steel Products Division • Steel and Tubes Division
Union Drawn Steel Division • Truscon Steel Company
Export Department: Chrysler Building, New York 17, N.Y.

Republic PIG IRON

"CHATEAUGAY"	"REPUBLIC"	"PIONEER"
Low-Phosphorus, Copper-Free	(Northern) Foundry, Basic and Malleable	(Southern) Foundry and Basic

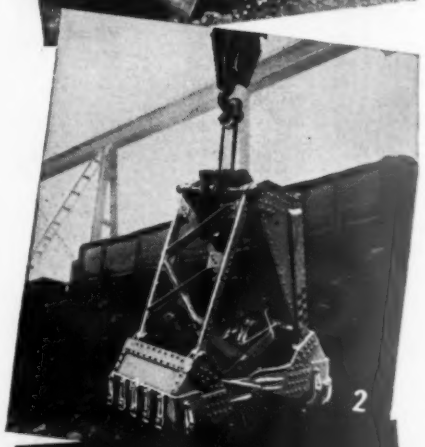
ALSO TRUSCON FOUNDRY FLASKS—REPUBLIC CORE WIRE—FOUNDRY NAILS

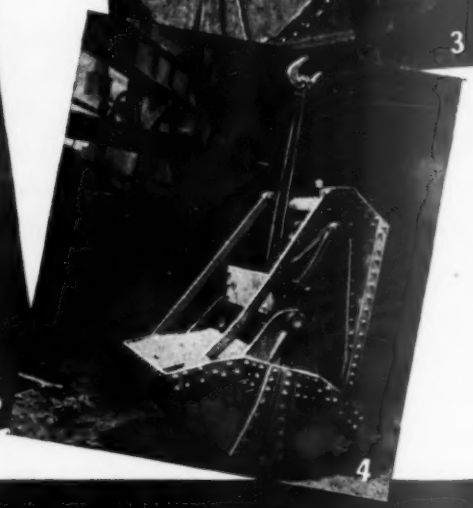
YES- BLAW-KNOX HAS THE BUCKET YOU WANT!

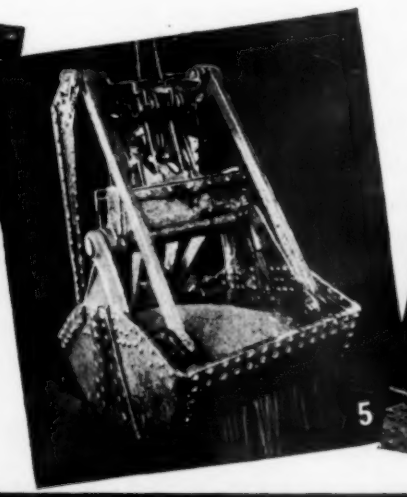
Choose a bucket designed for your particular job. From literally scores of types and sizes, which make the Blaw-Knox line of buckets so complete, we illustrate six typical applications.

1. Blaw-Knox Two Line Hook-on Type Bucket. Size 735-02 (rated 3 cubic yard). Open Hearth service. Weight 20,350 lbs. *Ask for Catalog No. 2002.*
2. Blaw-Knox Single Line Hook-on Type Bucket. Size 3201 (rated 2 cubic yard). Open hearth limestone to charging boxes. Weight 18,600 lbs. *Ask for Catalog No. 2002.*
3. Blaw-Knox Single Line Hook-on Type Bucket. Size 3100 (rated 1¼ cubic yard). Blast furnace cast house service. Weight 4800 lbs. *Ask for Catalog No. 2002.*
4. Blaw-Knox Single Line Hook-on Type Bucket. Size 0-3100 (rated 1¼ cubic yard). Steel Foundry service. Weight 4100 lbs. *Ask for Catalog No. 2002.*
5. Blaw-Knox Single Line Hook-on Type Bucket. Size 3175 (rated 2 cubic yard). Handling roll scale. Weight 7650 lbs. *Ask for Catalog No. 2002.*
6. Blaw-Knox (25 net ton) four-line symmetrical design Ore Bucket. Weight 49,000 lbs. *Ask for Catalog No. 1865.*

Other Blaw-Knox Catalogs describe and illustrate complete steel plant bucket applications.







BLAW-KNOX DIVISION

of Blaw-Knox Company

2097 Farmers Bank Building, Pittsburgh, Pa.

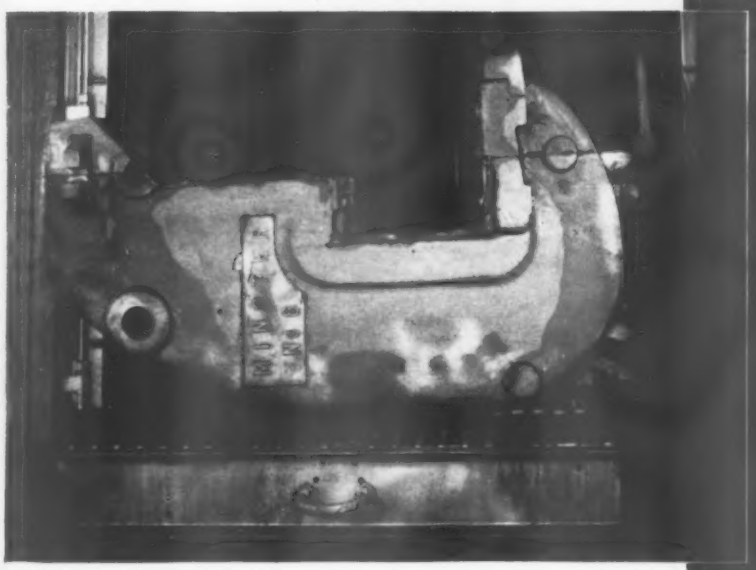
NEW YORK CHICAGO PHILADELPHIA BIRMINGHAM WASHINGTON

Representatives in Principal Cities

BLAW-KNOX BUCKETS

It's a Grim and Grimy Business this Business of Making Castings

Before Core Knockout and Cleaning



After Knocking Out Cases and cleaning by the Hydro-Blast system

Though it may be full of din and dirt and nerve-tensing effort—heat and sweat that shrivel the spirit of timorous souls—a blend of warmth and cold sensations—abruptly rising and falling temperatures—it's a grim and grimy, but great business.

There's but little glamour in the melting and pouring of metal, except to see the white, molten mass do your bidding. But in the cleaning room, there is nothing but hard work, and lots of dirt when you pick hard, complex cores from a casting by the conventional chipping method.

Only a handfull of old timers remain in the great foundry industry; men who pride themselves on their unusual skill; men who would rather knock out a tough core than a heavyweight champion.

Hydro-Blast claims no cure-all for the foundry cleaning room's age-old problems of din, dirt and physical effort. It does suppress dust, knock out cores faster and easier, eliminate the handling of spent sand by grab bucket and saves millions of transport ton miles presently required in foundries which are not Hydro-Blast equipped.

The HYDRO-BLAST CORPORATION
2550 N. WESTERN AVE.
CHICAGO 47,
ILLINOIS

These are our products

Volclay

WESTERN BENTONITE

Strongly entrenched
by 15 years of success
in foundry work.

Panther Creek

SOUTHERN BENTONITE

Combining the highest
Green Strength with
low Dry Strength.

AMERICAN COLLOID COMPANY

363 WEST SUPERIOR STREET • CHICAGO, ILLINOIS

Deposits and Processing Plants

WYOMING SOUTH DAKOTA MISSISSIPPI

Send for these informative, free bulletins. Mention them by number.

No. 240—FOUNDRY SAND PRACTICE. SELECTING, BLENDING AND PREPARATION OF SAND

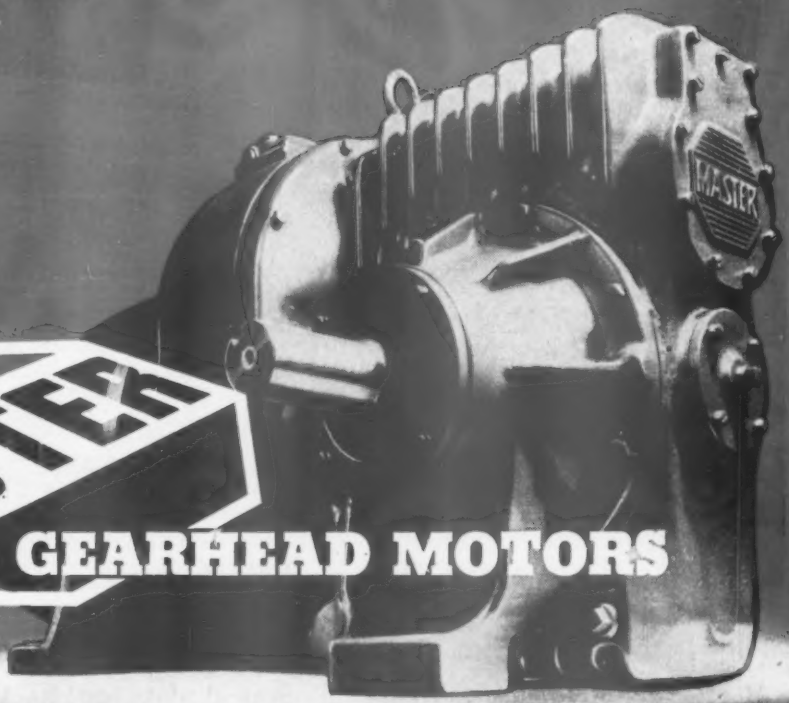
No. 223-C—HEAT PENETRATION INTO FOUNDRY MOLDS. MUCH INTERESTING DATA

No. 220-C—PANTHER CREEK BENTONITE. EFFICIENCY OF WESTERN VS. SOUTHERN BENTONITE

BUY UNITED STATES WAR BONDS

1/10 TO 100 HORSEPOWER
Five types of gearhead motors have reduction ratios ranging up to 432 to 1.

You can secure Master Gearhead Motors for mounting in any position because anti-friction bearings and all-metal lubricant seals are used throughout.



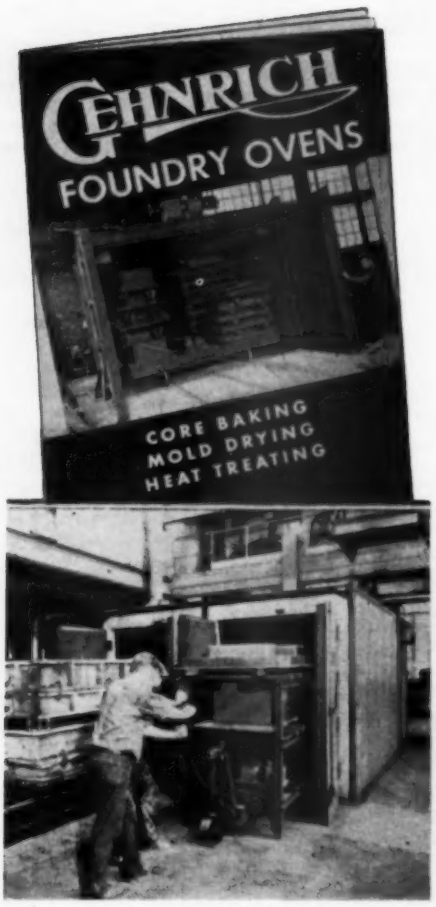
MASTER GEARHEAD MOTORS

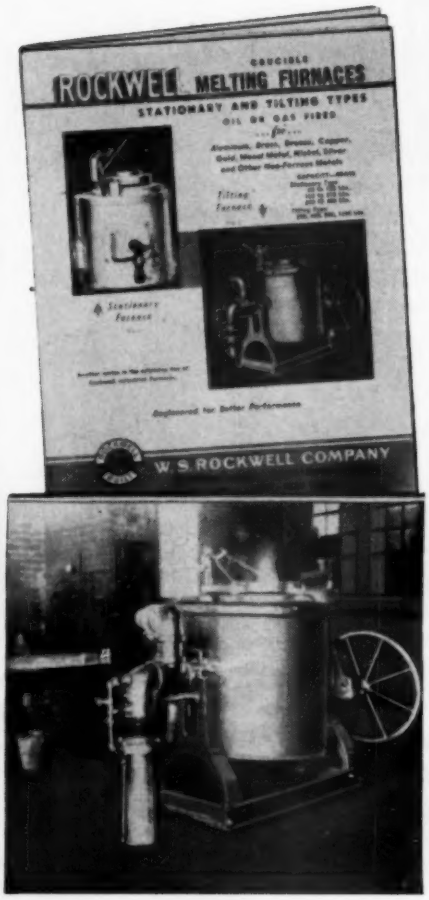
THE MASTER ELECTRIC COMPANY • DAYTON, OHIO

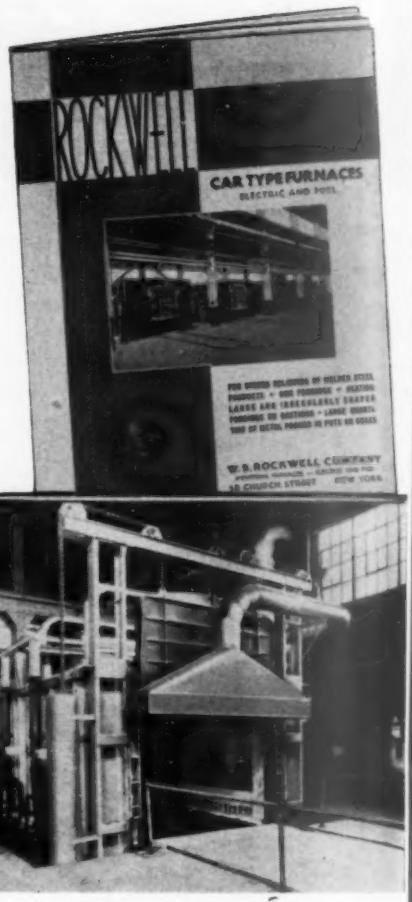
Available in a wide range of types including explosion proof, splash proof, fan cooled, multi-speed uni-brake motors and Speedrangers.

Save material and save space with simple, compact, integrally built Master gearhead motors.

NEW CATALOGS THAT ANSWER YOUR HEATING PROBLEMS







IN CORE BAKING

Here's complete information on recirculating convection heating plus Gehnrich Dual Panel Ovens for baking cores, drying molds and other low temperature processes. Shows a complete range of installations from the simple shelf or cabinet type to the large car type or continuous conveyor types.

IN METAL MELTING

Technical data on Rockwell gas or oil fired melting furnaces: Standard pot furnaces for soft metals, aluminum and magnesium; stationary and tilting type crucible melting furnaces for aluminum, copper alloys, nickel alloys, etc. and stationary and tilting type reverberatory furnaces.

IN HEAT TREATING

A number of interesting bulletins on fuel fired or electric ovens for preheating, annealing and normalizing aluminum and magnesium castings and on car type, elevator type and many continuous conveyor type furnaces for annealing, normalizing and heat treating ferrous castings.

A file of literature on this latest design foundry heat processing equipment will prove valuable when you are considering your post-war program of improvement. Free for the asking.

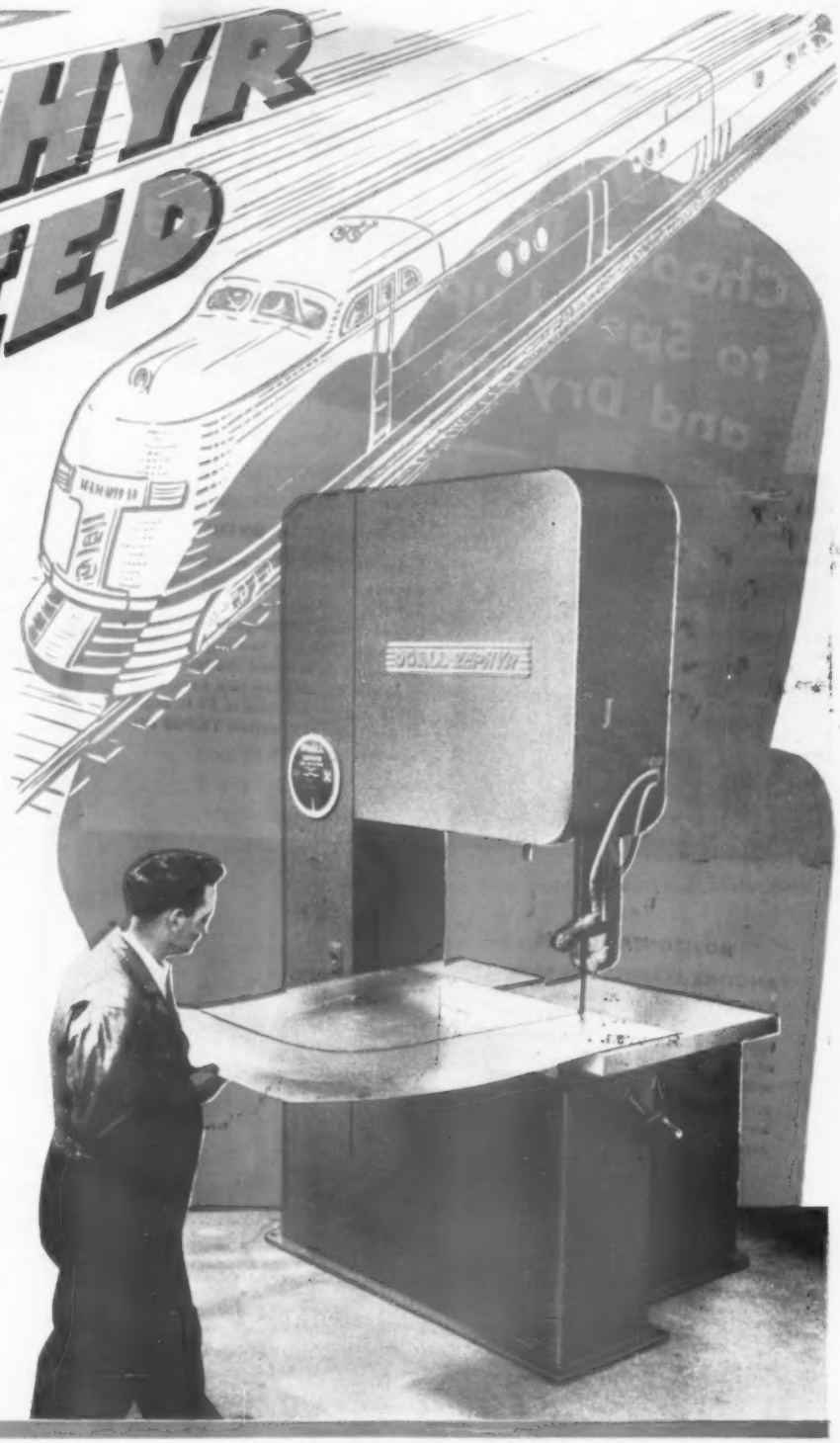
Write for Catalogs

W. S. ROCKWELL COMPANY • 56 CHURCH ST., NEW YORK 7, N. Y.

GEHNRICH OVENS • ROCKWELL FURNACES

BATCH OR CONVEYOR TYPES • OIL - GAS - ELECTRIC - STEAM - COKE

ZEPHYR SPEED



The DoALL Zephyr is rightly named, operating almost twice as fast as streamliner trains.

A highly precision-balanced, easy-to-guide band sawing machine tool for straight line, contour or bevel cutting. With a variable speed of 1,500 to 10,000 f.p.m., it brings to industry a faster, smoother method to cut materials of unusual hardness, brittleness, sponginess, etc.

Magnesium
Aluminum
Non-Ferrous Metals
Plastics
Laminates
Lumber and Plywoods

The 36" throat and 20" work thickness capacity make the Zephyr indispensable in handling extra large castings, forgings, bars and odd shaped parts.

Right now, there should be a place in your plant for this advance machine.

Write for illustrated, factual circular about the DoALL Zephyr.

DoALL

INDUSTRY'S NEW SET OF TOOLS

CONTINENTAL MACHINES, INC.
1352 S. Washington Ave. Minneapolis 4, Minn.

Sales & Service Offices: Baltimore, Boston, Chicago, Cleveland, Denver, Detroit, Erie, Houston, Indianapolis, Los Angeles, Milwaukee, Minneapolis, New Orleans, New York, Orlando, Philadelphia, Pittsburgh, Rochester, Rockford, St. Louis, San Francisco, Seattle, Toledo, Tulsa, West Hartford.

WHY Leaders Choose DESPATCH OVENS to Speed up all Baking and Drying Production

A Few Reasons Why So Many Foundries Use Despatch Ovens:

Engineering "know how," intelligently applied, distinguishes all Despatch ovens, large and small. And it is reflected in smooth, dependable performance in thousands of foundries.

This tradition of dependability has steadily grown for 42 years as foundrymen have proved in their own corerooms the sound performance of these ovens.

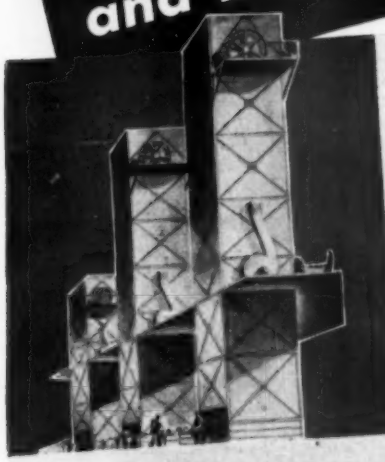
Whatever your needs, Despatch ovens do the job right, and are of the type, size and performance to help you operate most profitably.

Can You Use These Performance Advantages In Your Foundry?

Fast Baking of Capacity Loads
Guaranteed Heat Uniformity
More Core Output Per Man
Automatic Heat and Airflow Control
Reduced Baking Costs
Better Use of Floorspace
Easier Loading and Unloading
Adaptability for Future Needs
Up to 80% Recirculation of Heat
Standard Models for any Foundry
Economical Use of All Fuels

JUST OFF THE PRESS! New fully illustrated bulletins of Despatch Foundry Ovens.

ASK FOR BULLETINS 30, 31 and 32.

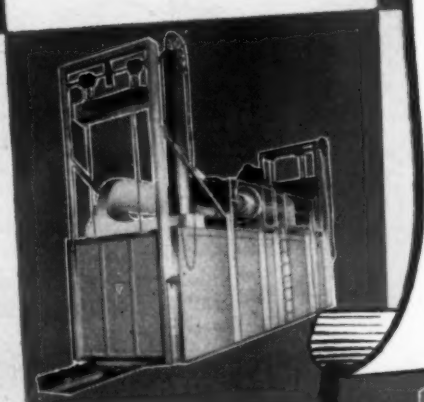


VERTICAL OVENS

HIGH PRODUCTION core baking is an easy matter with this typical battery of Despatch vertical conveyor ovens. Arranged with Despatch recirculating heating systems. Gas-fired or oil-fired models.

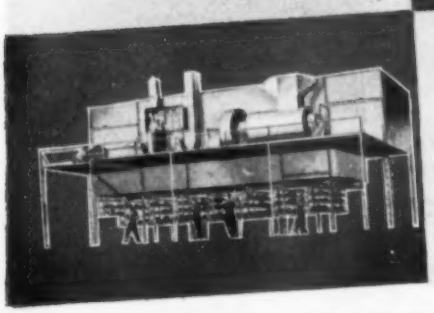
In this installation two ovens are 74 ft. high—the third is 54 ft. high.

Average production 13,000 lbs. of cores per hour.



HORIZONTAL OVENS

ANOTHER EXAMPLE of fast-baking ovens for production baking is this intermittent conveyor "pusher" type Despatch oven. Has capacity of 8000 lbs. per charge. Available with various material handling systems. Monorail, elevated and combination vertical-horizontal models also are supplied.

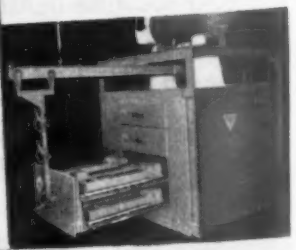


COMBINATION OVENS

SEPARATE HEATING and cooling sections are provided on this Despatch continuous conveyor oven. Has combination gas and oil-fired heater. A typical unit for production.

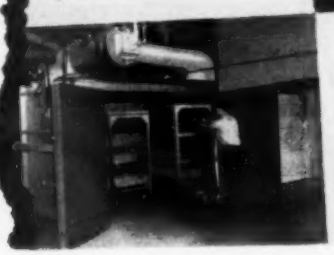
SHELF TYPE OVENS

LOW-COST UTILITY ovens to supplement production baking. Sturdy, well-insulated and convenient to use. Gas or electric heated.



DRAWER TYPE OVENS

THICK & THIN CORES bake at the same time in these Despatch drawer ovens. Unequalled for speedy production baking or special rush jobs. Heavy duty, rigid construction with smooth-rolling drawers which seal chamber when opened; gas, electric or oil-fired.



BATCH TYPE OVENS

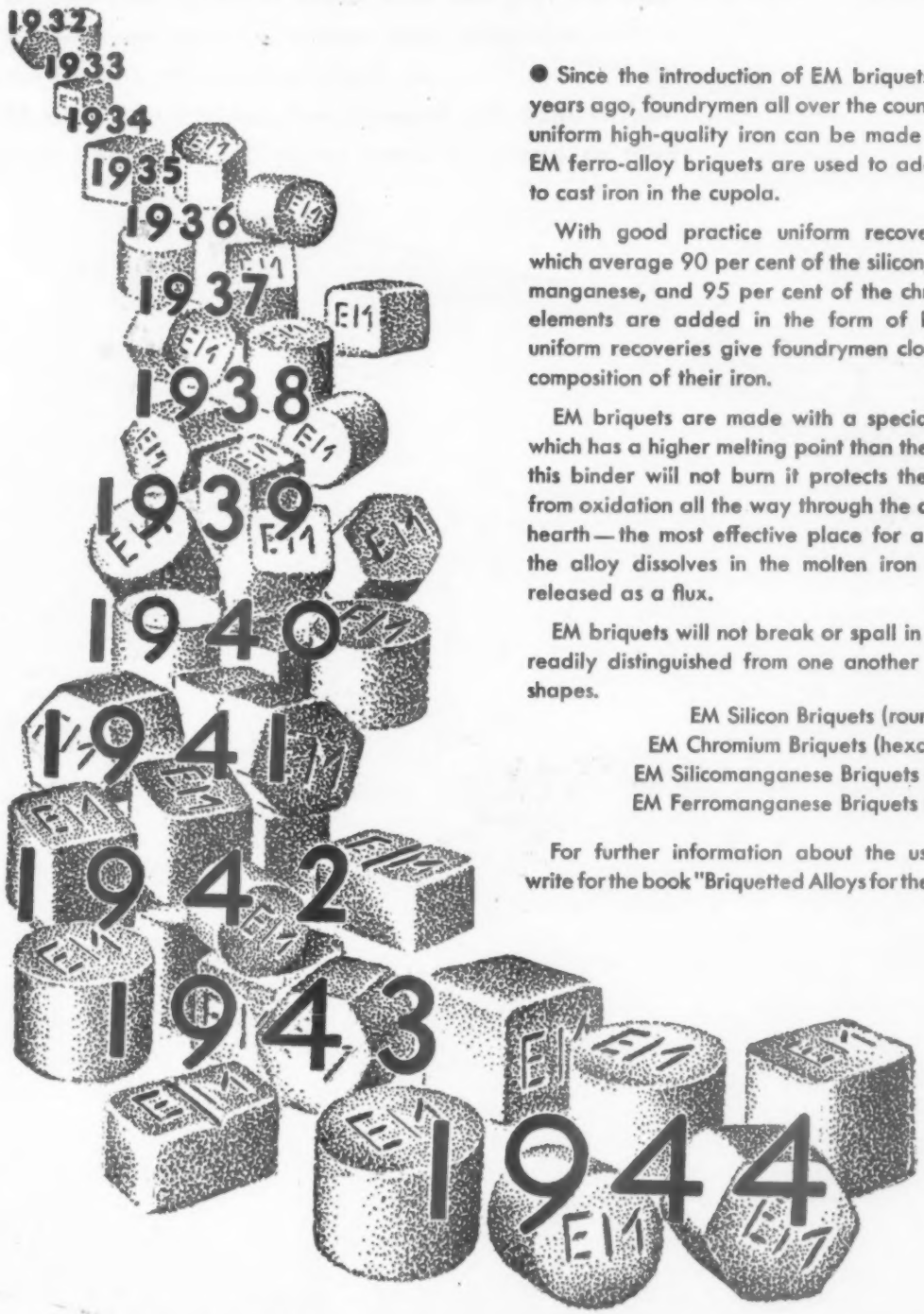
ALL SIZES OF CORES or molds are adapted to these ovens. Standard in most foundries for fast, uniform production baking.

Car loaded, rack loaded and truck loaded units in 64 different models.

VISIT THE DESPATCH BOOTH
326
AT THE METAL SHOW!

DESPATCH
OVEN COMPANY MINNEAPOLIS

12 YEARS of Successful Service Prove the Merit of EM Briquets



● Since the introduction of EM briquets more than twelve years ago, foundrymen all over the country have found that uniform high-quality iron can be made economically when EM ferro-alloy briquets are used to add alloying elements to cast iron in the cupola.

With good practice uniform recoveries are obtained which average 90 per cent of the silicon, 85 per cent of the manganese, and 95 per cent of the chromium, when these elements are added in the form of EM briquets. These uniform recoveries give foundrymen close control over the composition of their iron.

EM briquets are made with a special binding material which has a higher melting point than the ferro-alloys. Since this binder will not burn it protects the alloying elements from oxidation all the way through the cupola. When in the hearth — the most effective place for adding the alloys — the alloy dissolves in the molten iron and the binder is released as a flux.

EM briquets will not break or spall in handling. They are readily distinguished from one another by their distinctive shapes.

EM Silicon Briquets (round)
EM Chromium Briquets (hexagonal)
EM Silicomanganese Briquets (square)
EM Ferromanganese Briquets (oblong)

For further information about the use of EM Briquets, write for the book "Briquetted Alloys for the Cast Iron Foundry."

★ ★ BUY UNITED STATES WAR BONDS AND STAMPS ★ ★

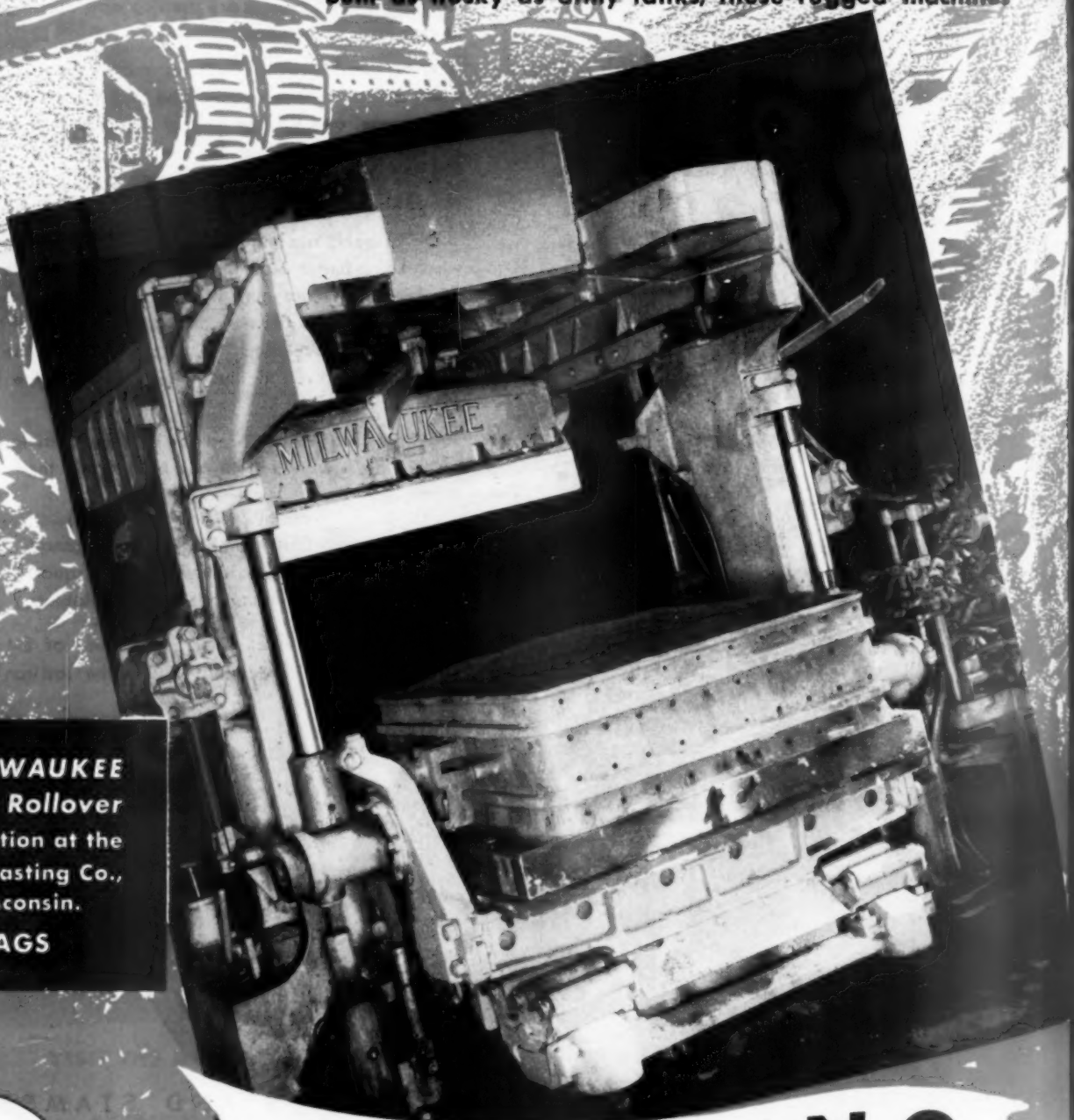
ELECTRO METALLURGICAL COMPANY
Unit of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.
In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario

Electromet
Trade Mark
Ferro-Alloys & Metals

"EM" is a registered trade-mark of Electro Metallurgical Company

Couple of 30 Ton

Here are two fast, time-tested molding machines for producing unusually large, semi-production molds—the MILWAUKEE Jolt Squeeze Rollover Draw for DRAGS and the MILWAUKEE Jolt Squeeze Adjustable Rail-Lift for COPES. Built as husky as army tanks, these rugged machines



No. 307 MILWAUKEE Jolt Squeeze Rollover Draw in operation at the Crucible Steel Casting Co., Milwaukee, Wisconsin.

For DRAGS

SQUEEZING

MILWAUKEE

MANUFACTURERS OF MOLDING MACHINES AND BRIQUETTING PRESSES

HUSKIES!...

have a squeeze capacity of 60,000 lbs. and are fully automatic. No more hand butting-off of large molds. All operations, including travel of platen car, are performed by POWER, with simple, foolproof mechanisms. Write today for further details regarding these big 30 ton huskies.

No. 305 MILWAUKEE Jolt Squeeze Rail-Lift, companion machine to the No. 307 at the Crucible Steel Casting plant.

For COPES

40"x40" MOLDS

Foundry Equipment Co.

WEST PIERCE STREET · MILWAUKEE, WISCONSIN, U.S.A.

CAN YOUR OVEN EQUAL this one

IN CLOSE CONTROL OF TEMPERATURE

COLUMBIAN STEEL TANK COMPANY

ESTABLISHED 1893

TRUCK TANKS, SEMI-TRAILER TANKS, OIL STATION AND OIL FIELD TANKS, UNDERGROUND TANKS, BARRELS, BUCKETS, FUNNELS, GASOLINE CANS, COMPLETE BULK OIL STATIONS, READY FORMED METAL BUILDINGS, FLARES, SHEETS, ANGLES, ETC.

GRAIN BINS AND TANKS FOR THE FARM, GRAIN ELEVATOR BINS, INDUSTRIAL STORAGE TANKS, STEAM CONDENSERS, CORRUGATED STEEL CULVERTS, TRUCK HOISTS AND DUMP BODIES, COMMERCIAL TRUCK BODIES, SHEET STEEL SPECIALTIES

CABLE ADDRESS: COLUMBIAN KANSAS CITY
WESTERN UNION - POSTAL

1401-1421 WEST 12TH STREET
KANSAS CITY, MO.

May 12, 1944

The Lanly Company
750 Prospect Avenue
Cleveland, Ohio

Gentlemen:

Enclosed you will find two (2) prints with negatives of the installation of the paint baking oven you recently designed and built for us.

We are delighted with the operation of this oven and find that it holds an evenly distributed heat throughout the unit. Before we started production with the oven, we tested with thermocouples, taking readings at nine different points in each stall, or a total of twenty-seven readings for the oven. After a slight adjustment of the duct openings, we found that the oven had a 40°F. variation in temperature and another 40°F. variation due to the off and on type of motor valve on the burner, giving a total variation throughout the entire oven of approximately 80°F. These tests were made at a temperature setting of 300°F. The highest temperature we have operated the oven is 475°F., but feel it had not reached the maximum then.

Again we wish to say we are well pleased with this installation.

Very truly yours,
COLUMBIAN STEEL TANK COMPANY
D. DeBrunner
D. DeBrunner, Engineer

DD:js
Encl.

ONLY 8° F. VARIATION IN THIS—A STANDARD LANLY OVEN

You can rely upon getting high efficiency from any type oven or furnace. Write for catalog.

THE LANLY CO.
OVENS FOR INDUSTRY
HEATED BY GAS, OIL, ELECTRICITY OR STEAM
750 PROSPECT AVENUE • CLEVELAND, OHIO

A hand that is hard to beat!

KORGLAZE

A sure thing is no gamble! The many modern manufacturers who are using KORGLAZE today, testify to the truth in that statement. KORGLAZE is a new product for processing cores to a fine finish. The saving of time, money and metal with the use of this vehicle, cannot be overestimated. Cores may be poured to such exactness of size that machining operations become merely finishing operations. The cored surface of castings shows a smooth, even finish and burnt out cores come quickly and freely away from the metal. When castings are of the fluid carrying type, cleaner washing is assured due to the smoothness of the center and the gathering of solids which may be in suspension, is eliminated.

UNITED

UNITED OIL MFG. CO. will be happy to furnish further detailed information on KORGLAZE, and solicits your early inquiry.

United OIL MFG. CO.

1429 WALNUT ST. ERIE, PA.

MSR

The Mark of Quality

Non-ferrous ingot of uniform analysis supplied by the plants of Michigan Smelting always bears the mark of quality.

Your specifications are adhered to absolutely. Production and laboratory controls of the latest, most modern type, assure highest possible accuracy.

More than fifty years of experience in the refining of non-ferrous scrap is your guarantee that you will get exactly what you specify when you do business with Michigan Smelting.

★ BUY WAR BONDS ★

MICHIGAN SMELTING & REFINING

Division of BOHN ALUMINUM & BRASS CORPORATION, DETROIT 26, MICH.

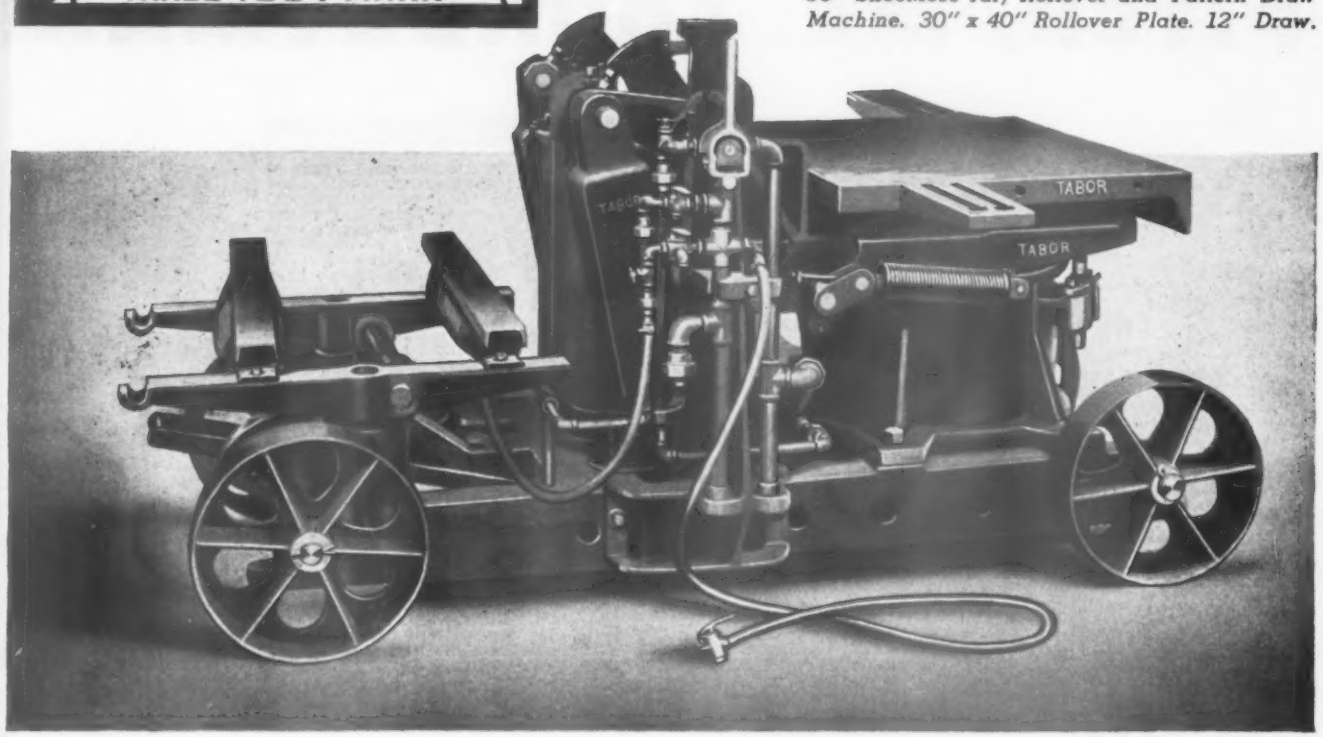
General Offices—Lafayette Bldg.

NON-FERROUS SCRAP METAL REFINERS FOR 50 YEARS

TABOR

TRADE 1884 MARK

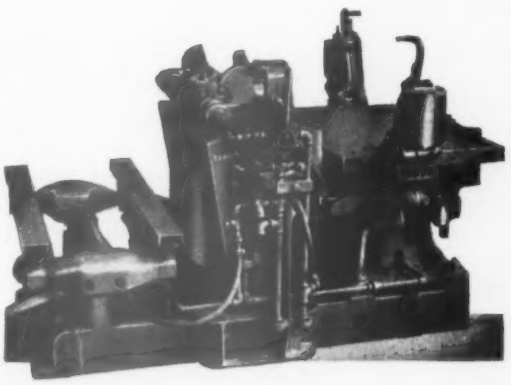
30" Shockless-Jar, Rollover and Pattern Draw Machine. 30" x 40" Rollover Plate. 12" Draw.



TABOR JAR, POWER ROLLOVER POWER PATTERN DRAW MACHINES

Tabor machines handle jobs up to their full rated capacity in a matter of seconds for a complete operating cycle. Ramming time is reduced to a minimum by the efficient Tabor jarring member . . . Rollover is oil controlled for maximum speed with absolute safety . . . Automatic leveling device eliminates possibility of shift . . . Draw is smooth at any desired speed by air-on-oil, and is accurate throughout the life of the machine.

Tabor Jar, Rollover Pattern Draw Machines are furnished in all practical sizes; plain-jar or shockless-jar; with or without air-operated flask clamps; stationary and portable types. Bulletin 424 illustrates and describes the complete line.

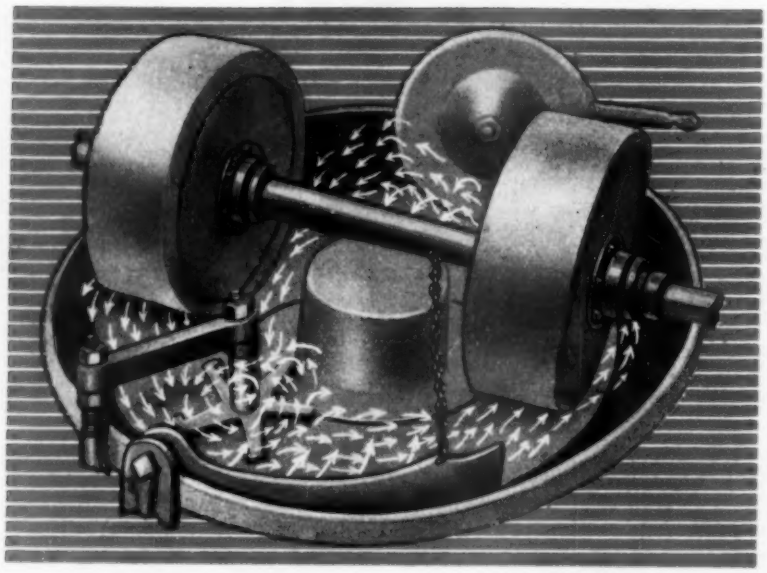


22" Plain-Jar, Rollover and Pattern Draw Machine. 22" x 42" Rollover Plate. 10" Draw. Equipped with air-operated Flask Clamps.

TABOR FOUNDRY MOLDING MACHINES:
FLASK LIFT MACHINES • SQUEEZERS AND JAR SQUEEZERS • JARRING MACHINES • ROLLOVER MACHINES • TABOR-BRASIVE CUT-OFF MACHINES

THE TABOR MANUFACTURING CO.
6225 Tacony Street
Philadelphia 35, Pennsylvania

. . . STAY IN THERE AND PITCH, MR. FOUNDRYMAN!



★ ★ ★ ★ ★ ★ ★ ★

"WE appreciate the remarkable job the foundry industry has been doing under difficult conditions, but we must ask you to do even more. The Nation is counting on you".

WAR PRODUCTION BOARD BULLETIN,
Issued August 14th, 1944.

★ ★

THE way to increase foundry production and control cost in war or in peace, is the traditional American way — IMPROVED EQUIPMENT.

This is what CLEARFIELD offers you in one important part of your work—the preparation of foundry sand.

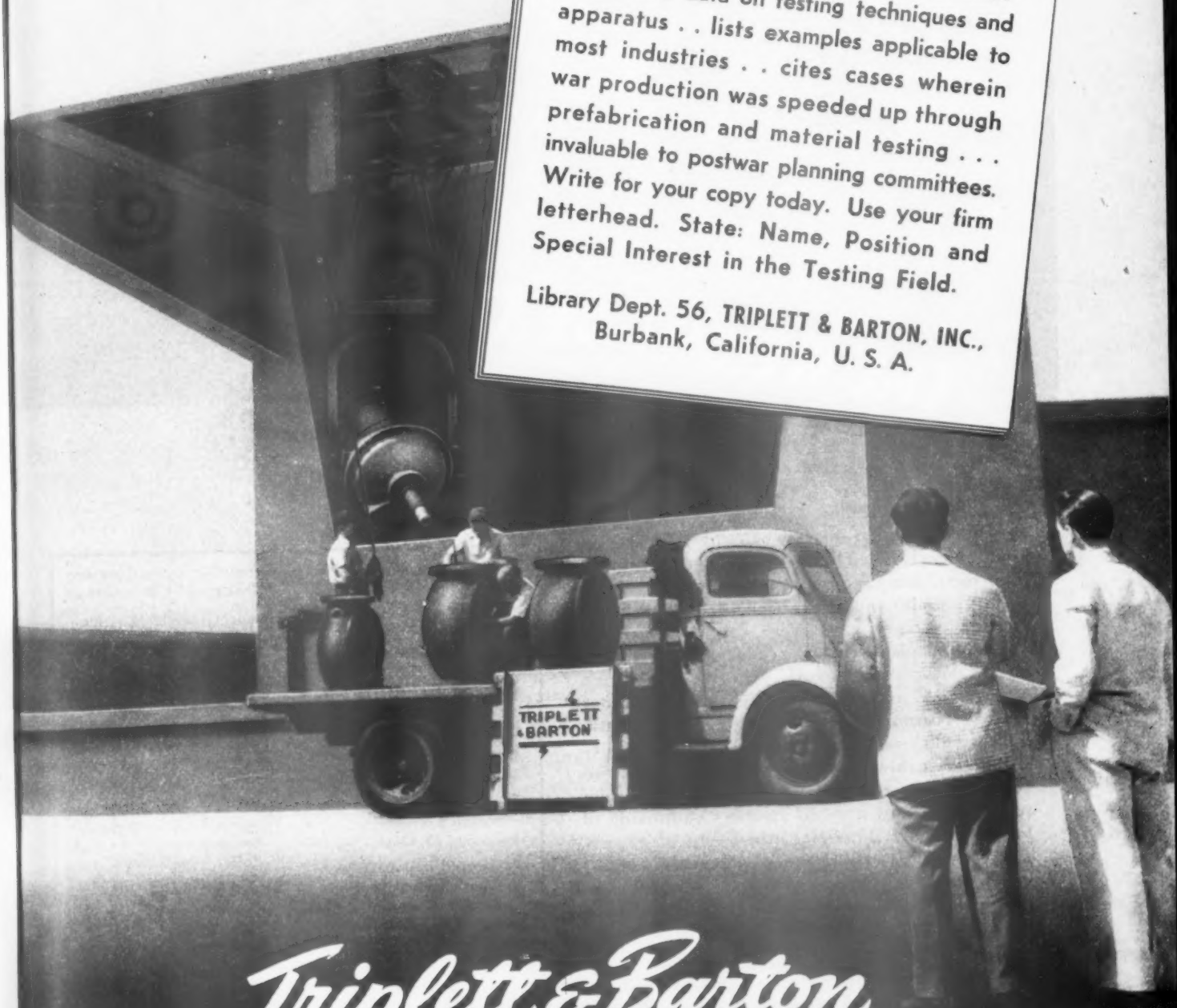
CLEARFIELD
MACHINE COMPANY

CLEARFIELD
PENNSYLVANIA, U. S. A.

For Comparison

THIS PAGE is a full size cover reprint from a new, informative, free booklet on Industrial Testing now being issued by Triplett & Barton, Inc. It contains comprehensive data on testing techniques and apparatus . . lists examples applicable to most industries . . cites cases wherein war production was speeded up through prefabrication and material testing . . . invaluable to postwar planning committees. Write for your copy today. Use your firm letterhead. State: Name, Position and Special Interest in the Testing Field.

Library Dept. 56, **TRIPLETT & BARTON, INC.,**
Burbank, California, U. S. A.



Triplett & Barton

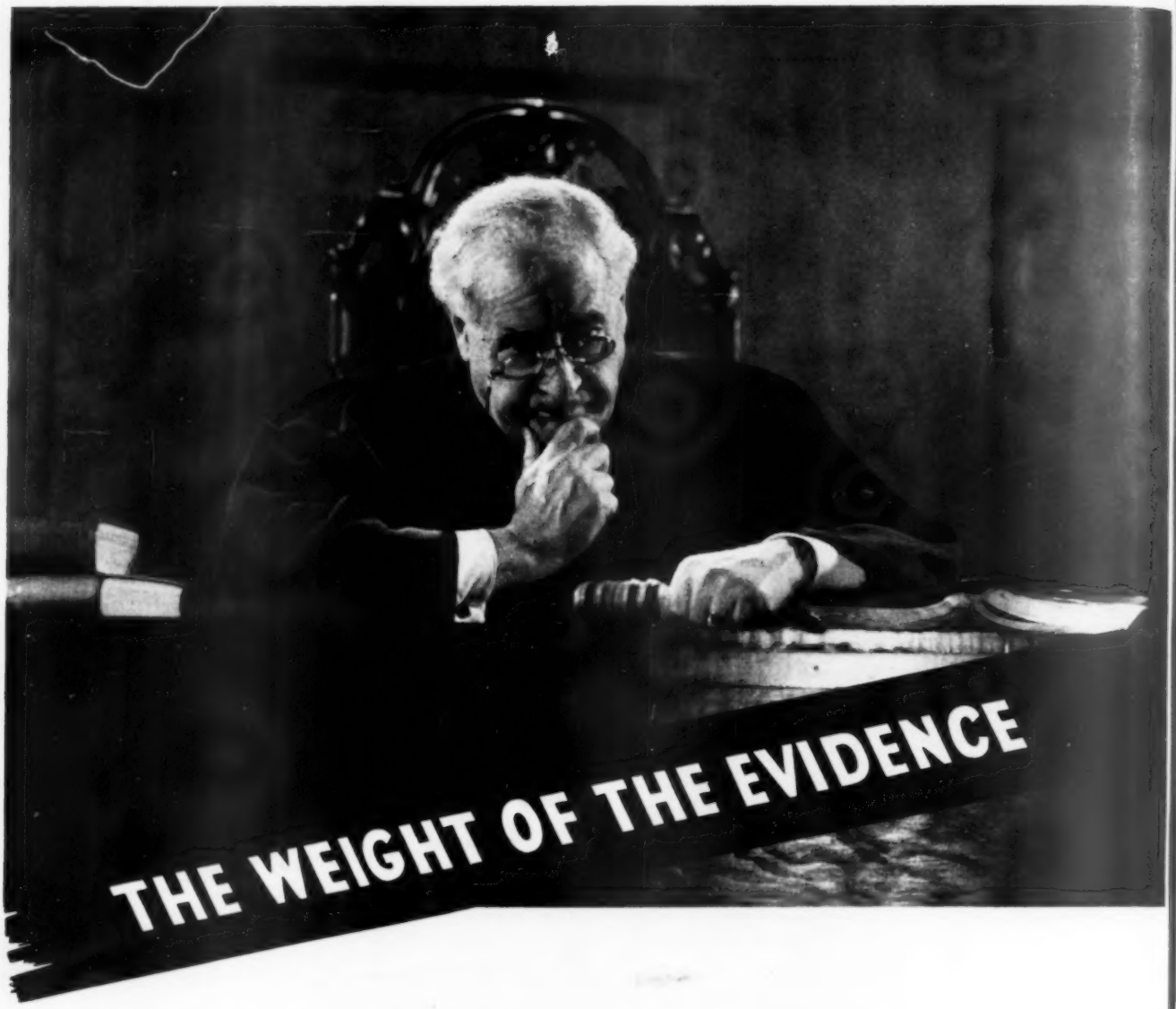
INCORPORATED

KNOWN FOR THE BEST IN TESTING METHODS

BURBANK, CALIFORNIA

SEATTLE, WASHINGTON WICHITA, KANSAS

MILLION VOLT X-RAY UNIT



The jury of Public Opinion has weighed the evidence and found it overwhelmingly in favor of aluminum alloys. This gleaming, easy-to-keep, light metal has captured the favor of the buying public. Its sales-appeal has been established. It has public acceptance.

Have you planned your product to take advantage of this?

Castings from our alloys can help you insure your postwar position . . . they will give you strength, light weight, ease of finishing, and long life. They will do these things because they can be tailored to fit your special problems. Furthermore, the plentiful supply of our raw material assures a continuing of low cost for our aluminum alloys.

The members of this group will gladly consult with you in the application of aluminum alloys to new uses or its substitution for other materials in the modernization of old designs. Perhaps we can help. Why not call us in?

U. S. Reduction Co. *East Chicago, Indiana*	General Smelting Company *Philadelphia 34, Pennsylvania*
Aluminum and Magnesium, Inc. *Sandusky, Ohio*	Samuel Greenfield Co., Inc. *Buffalo 12, New York*
The American Metal Company, Limited *New York City 6*	William F. Jobbins, Inc. *Aurora, Illinois*
Apex Smelting Co. *Chicago 12, Illinois*	R. Lavin & Sons, Inc. *Chicago 23, Illinois*
Berg Metals Corporation *Los Angeles 11, California*	The National Smelting Company *Cleveland 5, Ohio*
The Cleveland Electro Metals Co. *Cleveland 13, Ohio*	Niagara Falls Smelting & Refining Corp. *Buffalo 17, New York*
Federated Metals Division American Smelting and Refining Company *New York City 5 and Branches*	Sonken-Galamba Corporation *Kansas City 18, Kansas*

ALUMINUM RESEARCH INSTITUTE

111 West Washington Street, Chicago 2, Illinois

BUY BONDS

. . . cubic feet per minute

Let's imagine a stream of air cubes caught within some strong force that is squeezing them from their one-cubic-foot size down to smaller and smaller cubes . . . increasing the pressure within them . . . pushing them into a pipe . . . creating compressed-air power. Cube after cube flows on as we count *cubic feet per minute* . . . in short we say *cfm*.

Emerging somewhere from the end of a distribution pipe these compressed cubes are expanding . . . exerting compressed-air power, doing work. Finally, the cubes regain their original size and pressure . . . again become free atmosphere. Once more we count them . . . so many *cfm*.

Machines that squeeze or compress the air are called *air compressors*. Machines that use the compressed air to push a piston, or turn a wheel, are called *air tools* . . . drills, hammers, wrenches, hoists, and grinders. *Cfm* is the "yardstick" for measuring both the capacity of compressors and the air consumption of air tools.

But *cfm* is only one means of appraising these machines. On countless compressors and air tools, widely used throughout the world, both in peacetime and in war, you will find the IR trademark. This symbol stands for nearly 75 years of pioneering and development in the compressed-air industry. It is your assurance of a reliable machine that will economically produce or apply compressed-air power.

Air for power purposes is usually compressed to 100 pounds pressure in machines varying in size from 2 to 16,000 cfm, requiring from ½ to 3000 horsepower. But there are hundreds of other uses for compressors.

One example is a 2500-horsepower I-R compressor that inhales about 3600 cfm (a box-car full every minute) of nitrogen and hydrogen gas, squeezing the gas in seven steps to one-thousandth of its original size . . . increasing its pressure to 15,000 pounds . . . an important step in producing synthetic ammonia needed in the manufacture of explosives and fertilizers.

Consider also machines like a 15,000-horsepower I-R Turbo-Blower in a steel plant . . . compressing 125,000 cfm of air to 30 pounds for combustion in the blast furnaces.

Ingersoll-Rand

11 BROADWAY, NEW YORK 4, N. Y.

1-500

COMPRESSORS • TURBO-BLOWERS • ROCK DRILLS • AIR TOOLS • CENTRIFUGAL PUMPS • CONDENSERS • OIL AND GAS ENGINES

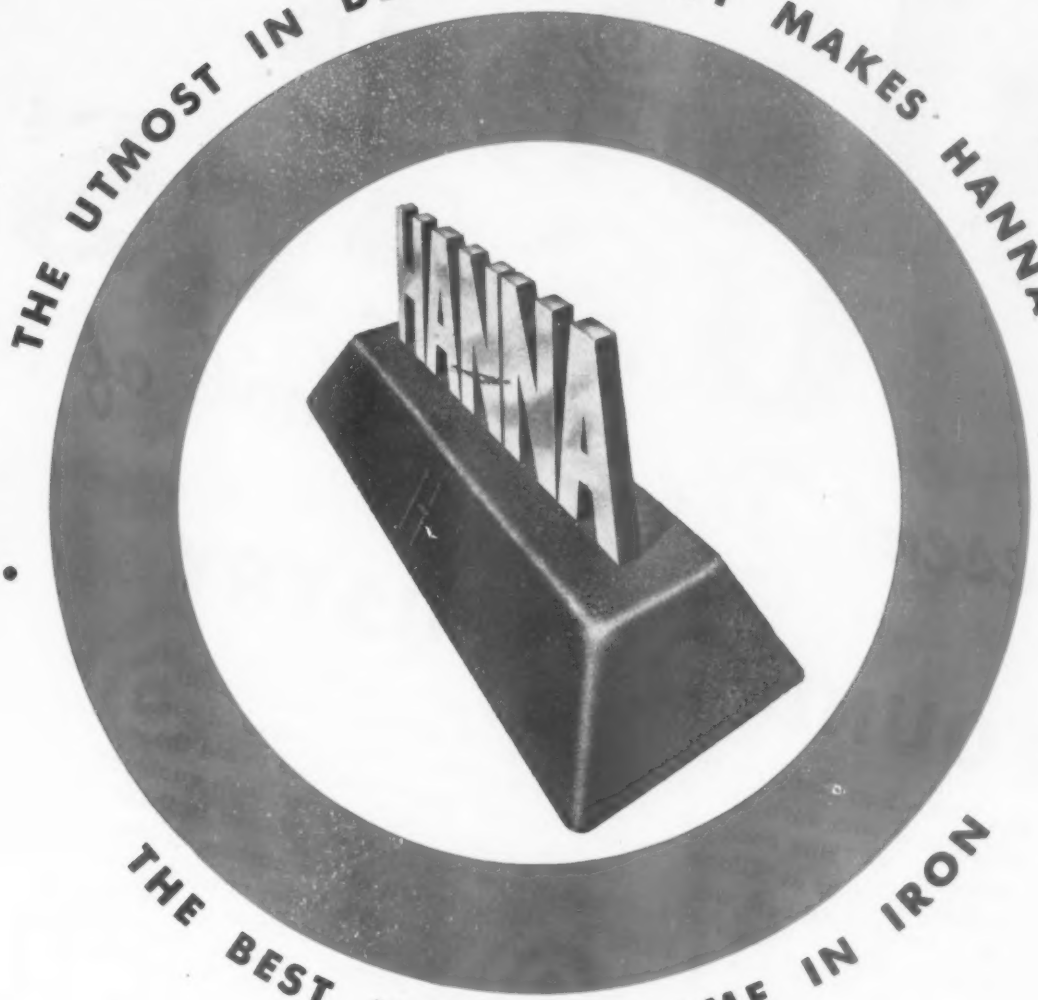
HINES "Pop-Off"* FLASKS won't let them down....

...and Hines Pop-Off Flasks won't let the mold "down" either. Serrations on the inside surface of the flask anchor the sand firmly—eliminate sand strips—prevent sag or drop in cope and drag. Yet, no matter how heavily rammed, this flask is easily removed by releasing a couple of levers—no need to pound or maul and take chances of damaging the mold—it literally "pops" right off. Enthusiastic users report more perfect molds per hour with less scrap—the finest flask they've ever used.

*PATENTED

THE HINES FLASK CO.

1324 HIRD AVENUE CLEVELAND 7, OHIO



BRANDS: Buffalo • Detroit • Susquehanna

GRADES: Basic • Foundry • Malleable • Ferro-Silicon • Silvery

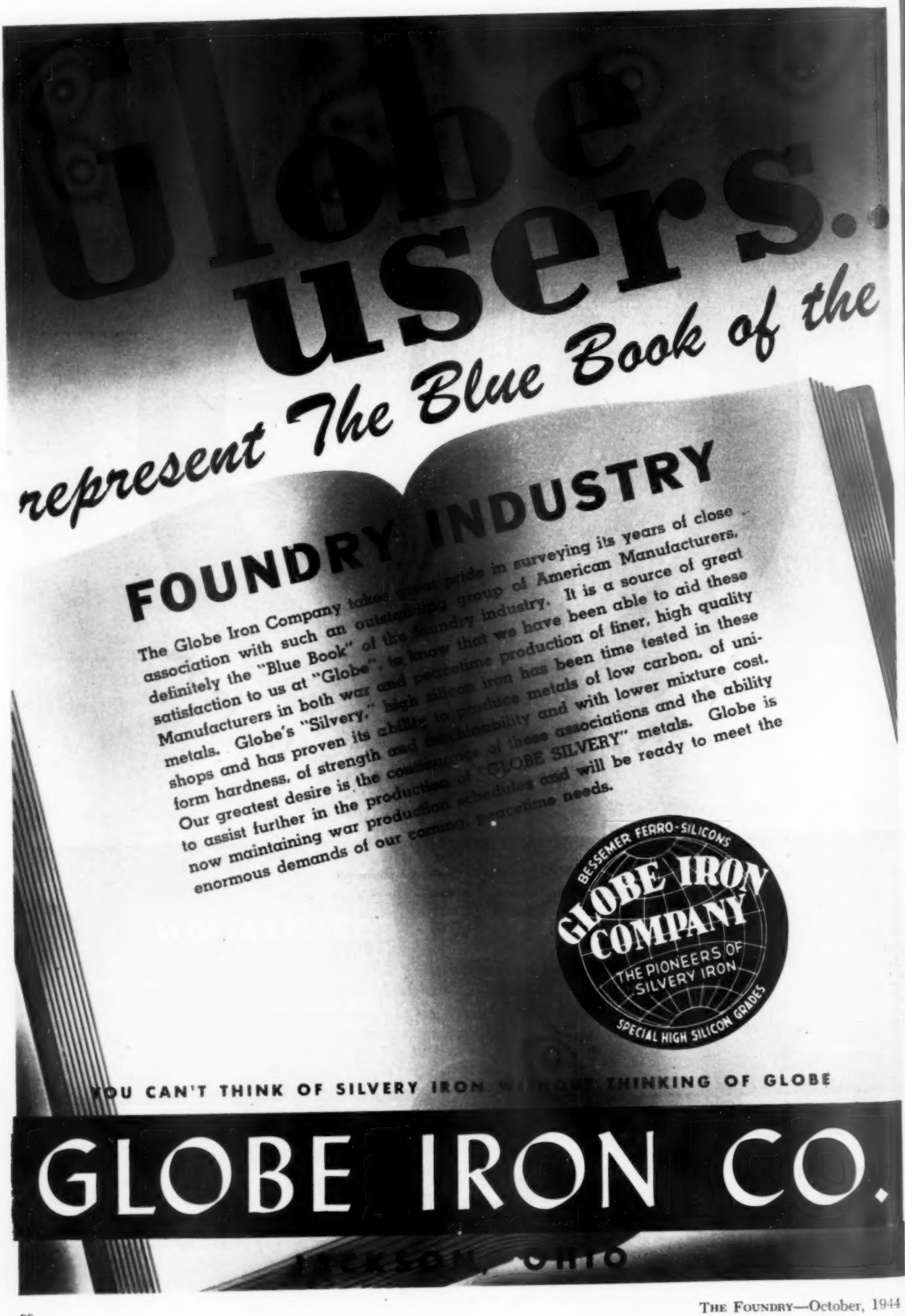
THE HANNA FURNACE CORPORATION

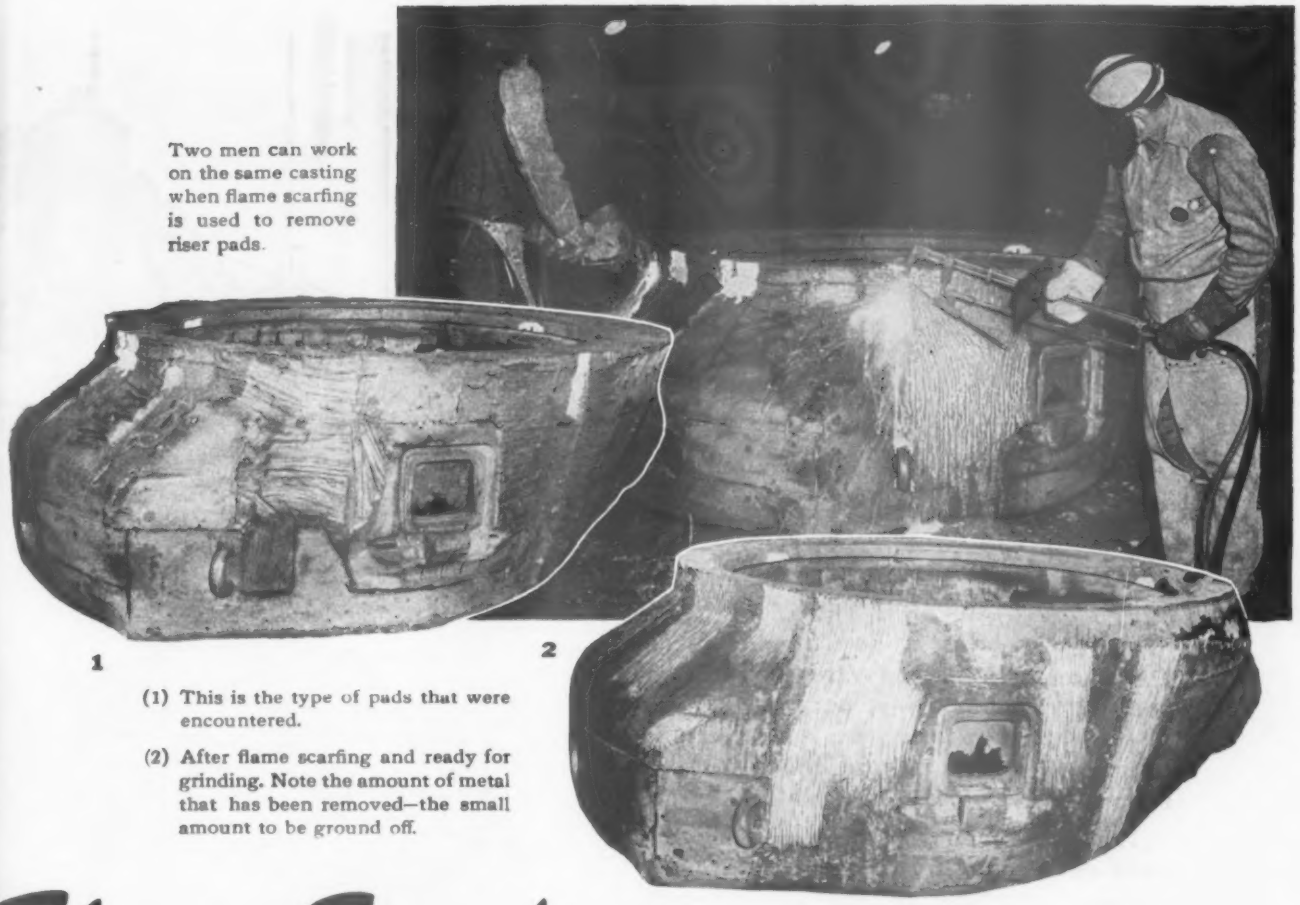
BUFFALO • DETROIT • NEW YORK • PHILADELPHIA • BOSTON

MERCHANT PIG IRON DIVISION OF

NATIONAL STEEL CORPORATION

EXECUTIVE OFFICES: PITTSBURGH, PA.


Globe users..
represent The Blue Book of the
FOUNDRY INDUSTRY
The Globe Iron Company takes great pride in surveying its years of close association with such an outstanding group of American Manufacturers, definitely the "Blue Book" of the foundry industry. It is a source of great satisfaction to us at "Globe", to know that we have been able to aid these Manufacturers in both war and peacetime production of finer, high quality metals. Globe's "Silvery," high silicon iron has been time tested in these shops and has proven its ability to produce metals of low carbon, of uniform hardness, of strength and machinability and with lower mixture cost. Our greatest desire is the continuance of these associations and the ability to assist further in the production of "GLOBE SILVERY" metals. Globe is now maintaining war production schedules and will be ready to meet the enormous demands of our coming peacetime needs.
BESSEMER FERRO-SILICONS
GLOBE IRON COMPANY
THE PIONEERS OF SILVERY IRON
SPECIAL HIGH SILICON GRADES
YOU CAN'T THINK OF SILVERY IRON WITHOUT THINKING OF GLOBE
GLOBE IRON CO.
JACKSON, OHIO



Two men can work on the same casting when flame scarfing is used to remove riser pads.

1

2

(1) This is the type of pads that were encountered.

(2) After flame scarfing and ready for grinding. Note the amount of metal that has been removed—the small amount to be ground off.

Flame Scarfing CUTS GRINDING TIME 58%

FORMERLY, riser pads left on these cast steel tank turrets were removed by grinding. This long, tedious process required the removal of well over 100 pounds of metal and used up expensive grinding wheels at an alarming rate.

When flame scarfing was adopted for the job, over 100 pounds of metal were removed by the scarfing torch, reducing grinding time 58%—with a corresponding saving in grinding wheel costs. Two men could be employed on the scarfing operation, further speeding production.

This case is typical of the manner in which many foundrymen are using modern Airco-developed oxyacetylene methods to break production bottlenecks, cut costs and improve quality.

For further examples—and information that will enable you to apply these important time-and-money-saving methods to your own operations, consult Airco's latest booklet, "New and Improved Oxyacetylene Methods for Steel Foundries." If you do not have a copy, ask your nearest Airco office or write Department F.

★ BUY UNITED STATES WAR BONDS ★

AIRCO

AIR REDUCTION

General Offices: 60 East 42nd Street, New York 17, N.Y.

In Texas: Magnolia Airco Gas Products Co. • General Offices: Houston 1, Texas

Offices in All Principal Cities

AMONG
PLANT
ENGINEERS

PRECISION IS IMPORTANT!

Because plant engineers know and appreciate the advantages of precision construction, they naturally favor machines like the Sullivan WG-9 air compressor.

Plant engineers know that the greater capacity of the WG-9, per square foot of floor area, is the direct result of precision manufacture and the judicious use of modern, lightweight alloy metals.

They know, too, that the WG-9 is the only double-acting, single-stage compressor that provides these advantages:

1) Full force-feed lubrication to all working parts.
2) Replaceable cylinder liners and crosshead guides.
3) "Dual-Cushion" valves.
4) Anti-friction main bearings.

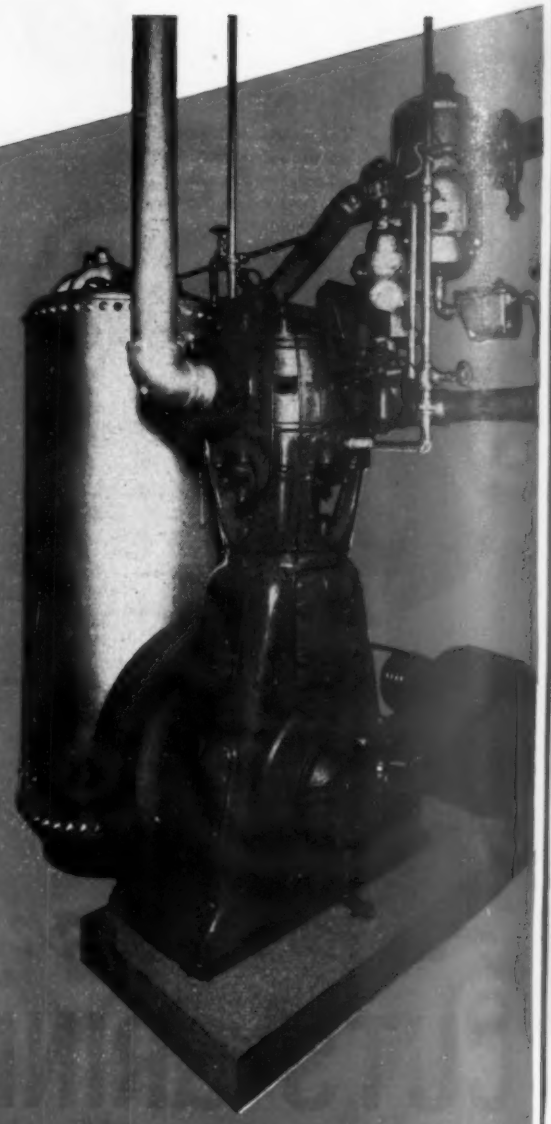
There are twenty more construction features on the WG-9 that appeal to men who know machinery. Your copy of Bulletin A-43, containing complete details, is ready for you. Sullivan Machinery Company, Michigan City, Indiana. In Canada: Canadian Sullivan Machinery Co., Ltd., Dundas, Ontario.

OFFICES

Seattle	Pittsburgh	Knoxville	Butte
Boston	St. Louis	Huntington	Salt Lake City
New York	Detroit	Los Angeles	Scranton
Chicago	San Francisco	Duluth	Denver
Portland	Birmingham	El Paso	Dallas

SULLIVAN
AIR COMPRESSORS

FROM ¼ TO 3,000 H. P.



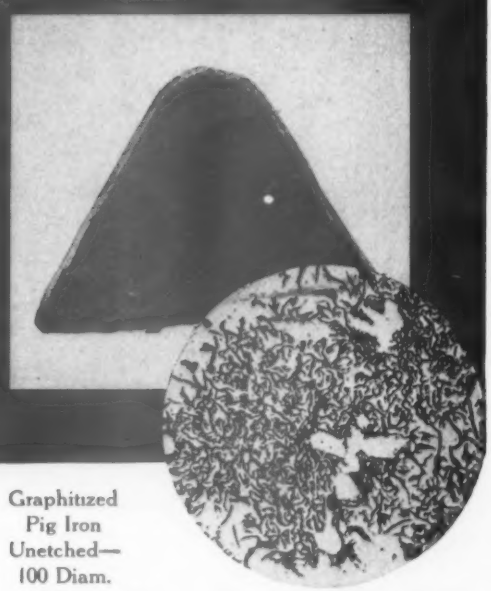
The WG-9 is designed for continuous, heavy-duty service in industries having moderate air power requirements. Available in eleven sizes, with displacements from 153 to 822 C. F. M., 30 to 150 p.s.i.

PRODUCTS

STATIONARY AND PORTABLE AIR COMPRESSORS FROM ¼ TO 3000 H. P., PNEUMATIC CASTING GRIPS, FOUNDATION BREAKERS, PORTABLE HOISTS, ROCK DRILLS.

An outstanding improvement in Pig Iron

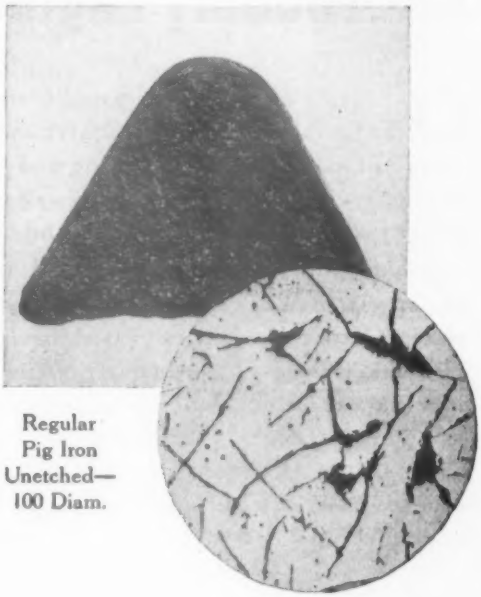
G-IRON*



Graphitized Pig Iron Unetched—100 Diam.

*GRAPHITIZED pig iron which imparts to gray iron castings an improvement in—

GRAIN REFINEMENT
MACHINEABILITY
FLUIDITY
SHRINKAGE



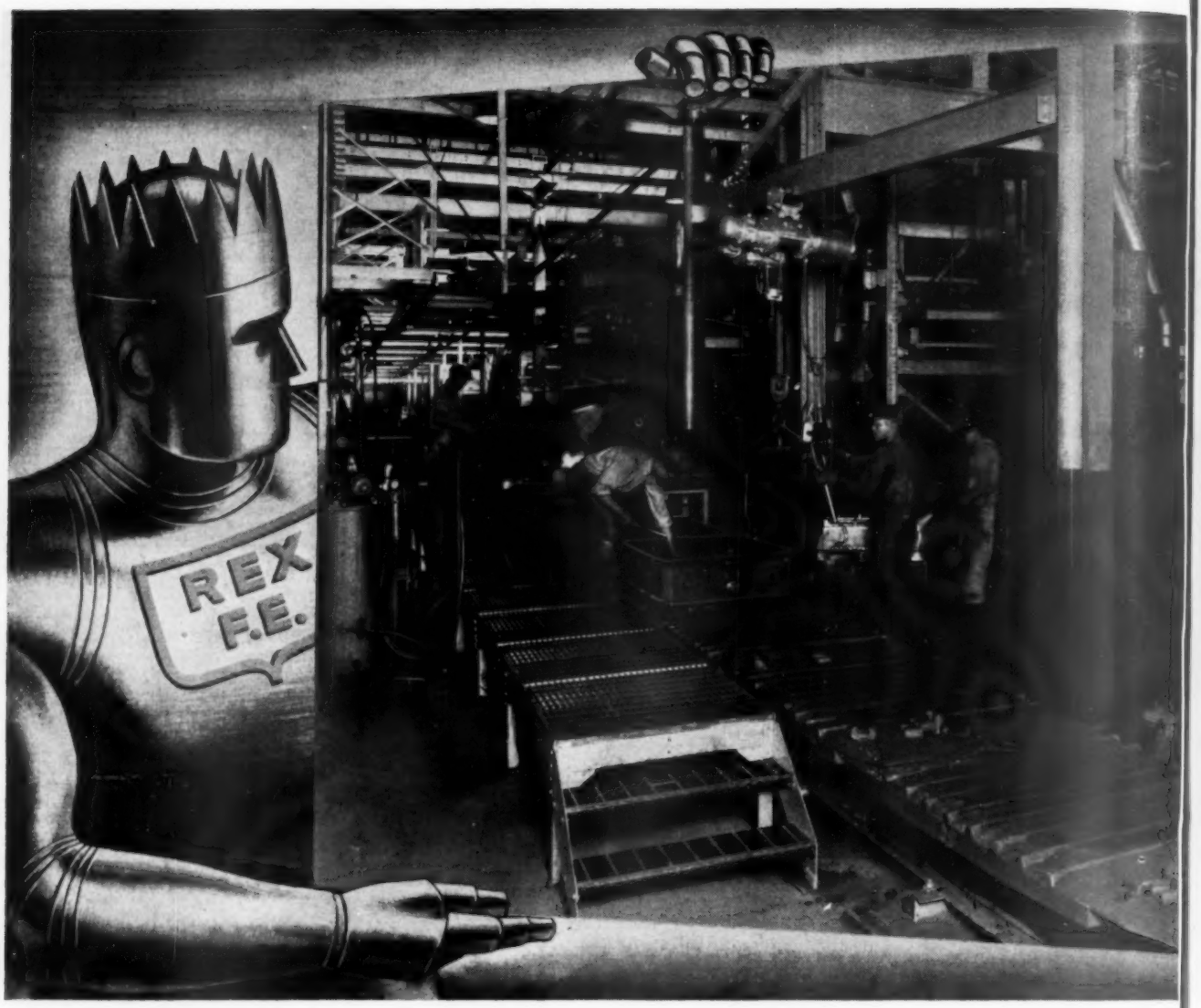
Regular Pig Iron Unetched—100 Diam.

TONAWANDA IRON CORPORATION

NORTH TONAWANDA, N. Y.

Division of AMERICAN RADIATOR & Standard Sanitary CORPORATION

* *Covered by U. S. and Canadian Patents*



Rex Foundry Engineering Increases Foundry Capacity

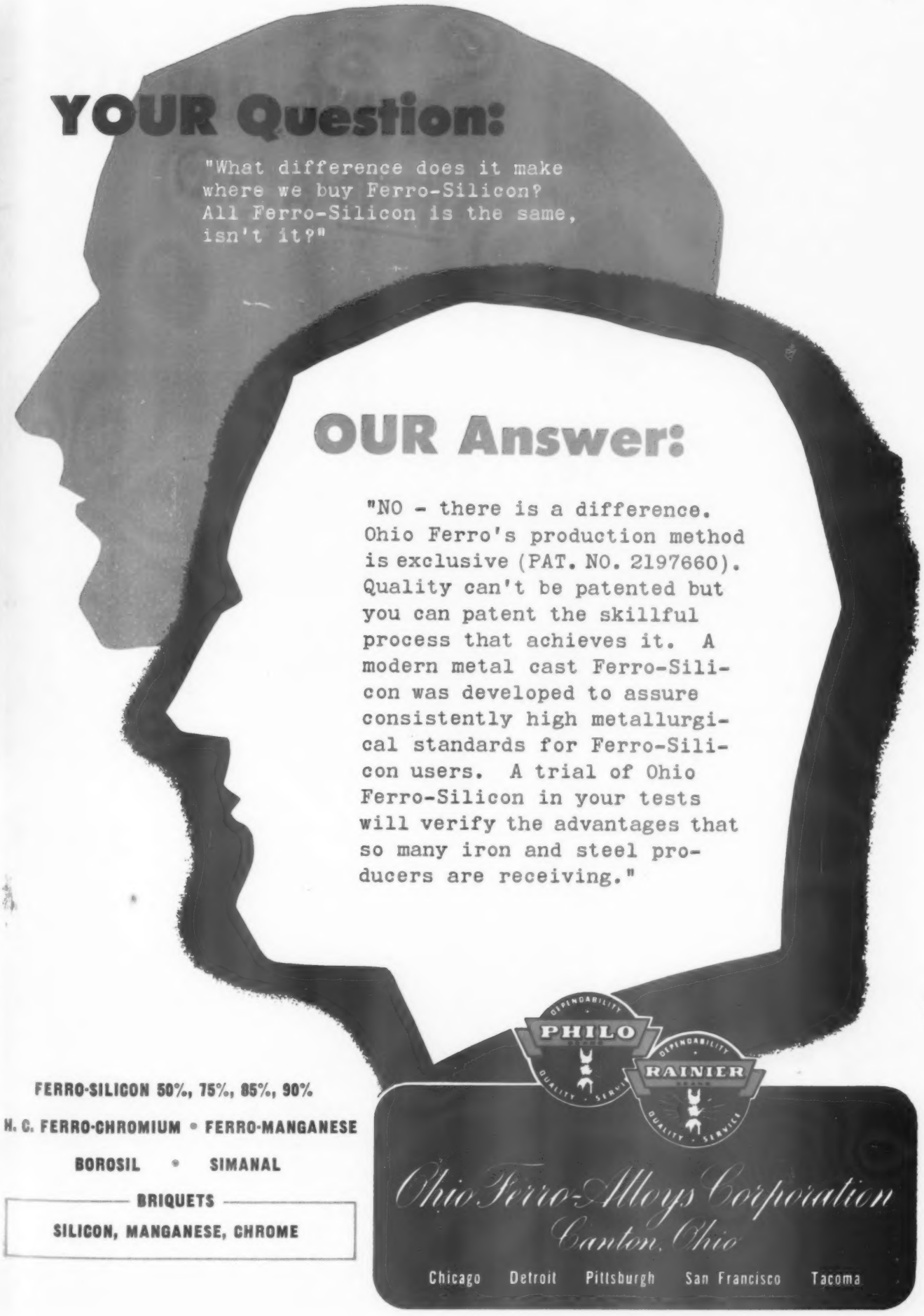
ONE major factor in increasing foundry capacity is the basic problem of materials handling. The conveying of molds . . . the handling and reconditioning of sand . . . the moving of castings—all these problems directly affect production capacity and operating costs.

In foundries, large and small, Rex Foundry Engineering specialists have solved this problem. Rex foundry systems have materially increased the output of the individual molder—a particularly important contribution in these days of critical labor shortages. They have saved floor space . . . reduced the cost per ton for indirect labor . . . reduced scrap iron loss due to sand . . . reduced flask loss and inventory . . . reduced handling and finishing costs.

Rex Foundry Engineers do not attempt to apply "ready made" solutions to foundry problems. They study each foundry carefully and design the best "work flow" plan that will deliver the greatest capacity at the most economical cost. They are always at your service . . . to help you design and install the best system for your foundry. For complete information, write Chain Belt Company, 1671 West Bruce Street, Milwaukee 4, Wisconsin.

REX **FOUNDRY HANDLING SYSTEMS**

CHAIN BELT COMPANY *OF MILWAUKEE*


YOUR Question:
"What difference does it make where we buy Ferro-Silicon? All Ferro-Silicon is the same, isn't it?"
OUR Answer:
"NO - there is a difference. Ohio Ferro's production method is exclusive (PAT. NO. 2197660). Quality can't be patented but you can patent the skillful process that achieves it. A modern metal cast Ferro-Silicon was developed to assure consistently high metallurgical standards for Ferro-Silicon users. A trial of Ohio Ferro-Silicon in your tests will verify the advantages that so many iron and steel producers are receiving."
PHILO
RAINIER
FERRO-SILICON 50%, 75%, 85%, 90%
H. C. FERRO-CHROMIUM • FERRO-MANGANESE
BOROSIL • SIMANAL
BRIQUETS
SILICON, MANGANESE, CHROME
Ohio Ferro-Alloys Corporation
Canton, Ohio
Chicago Detroit Pittsburgh San Francisco Tacoma

...LIKE PUTTING RABBITS INTO A HAT

SQUEEZING large air capacity into a small space is a good deal like putting rabbits *into* a hat.

Yet, that's exactly what Gardner-Denver engineers accomplished in designing their "WB" Vertical Two-Stage Compressors. Able to fit into a space only 5 feet square, these efficient compressors have an air output comparable to that of large two-stage Horizontal Compressors. They permit valuable savings in floor space that eliminate the necessity of re-arranging crowded plant floors to accommodate them.

Distinctively designed, the "WB" uses two low pressure cylinders in conjunction with each high pressure cylinder. This construction permits the use of small, lightweight pistons in all cylinders, considerably reducing the inertia load and making possible the reduction in compressor size without sacrifice of capacity.

★

NOTE THESE FEATURES:

1. **Drop forged crankshaft mounted on Timken roller main bearings.**

OTHER "WB" COMPRESSOR FEATURES

2. **Built for service with castings of Gar-Durloy for extra strength and hardness.**
3. **Fully water-cooled cylinders for lubrication oil economy and lower discharge temperatures.**
4. **"Cushioned" Duo-plate valves are silent . . . assure maximum efficiency and lowest power consumption.**

For complete information on Gardner-Denver "WB" compressors, write Gardner-Denver Company, Quincy, Illinois.

GARDNER-DENVER

Since 1859

Ransohoff

AUTOMATIC . . . STAR-RETURN

WET

CLEANING

MILLS

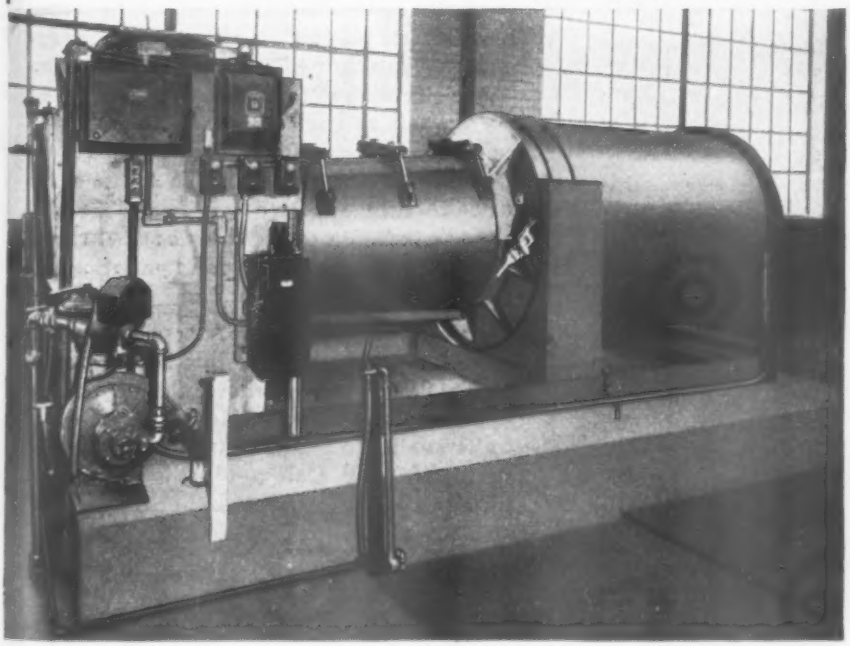
SAVE 30% to 70% ON YOUR CLEANING COSTS

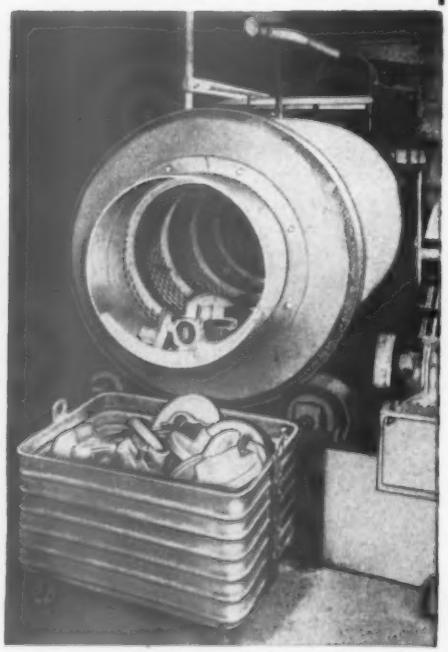
TO ECONOMIZE . . . YOU MUST MODERNIZE

"Horse and buggy" methods may have seemed adequate in the Gay Nineties . . . and some foundries are still using them at excessive costs per ton. Today's "do it twice as fast and twice as well at lowest possible costs" demands call for streamlined production . . . which is what you get with RANSOHOFF CLEANING MILLS . . . speedy, gentle, economical, not self-destructive, automatic handling of stars.

SEND US A SAMPLE BATCH

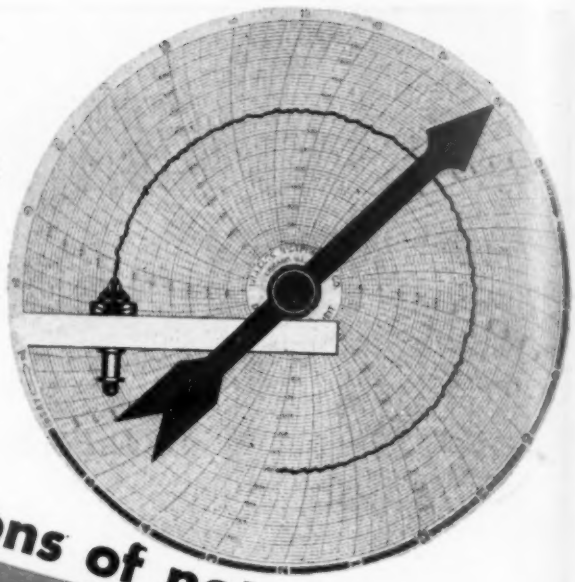
Illustrations show two views of a Ransohoff Side-loading, End-unloading wet mill cleaning miscellaneous grey iron castings. Loading is done through door in side. Small work is dumped in; large or fragile work is packed into the drum, loaded and unloaded from the side. Small work is unloaded automatically from end of mill as in photo to right. Stars fill all voids completely. Very rapid cleaning results without nicking, breaking or mill wear. Wet method eliminates dust-collecting systems and health hazards.



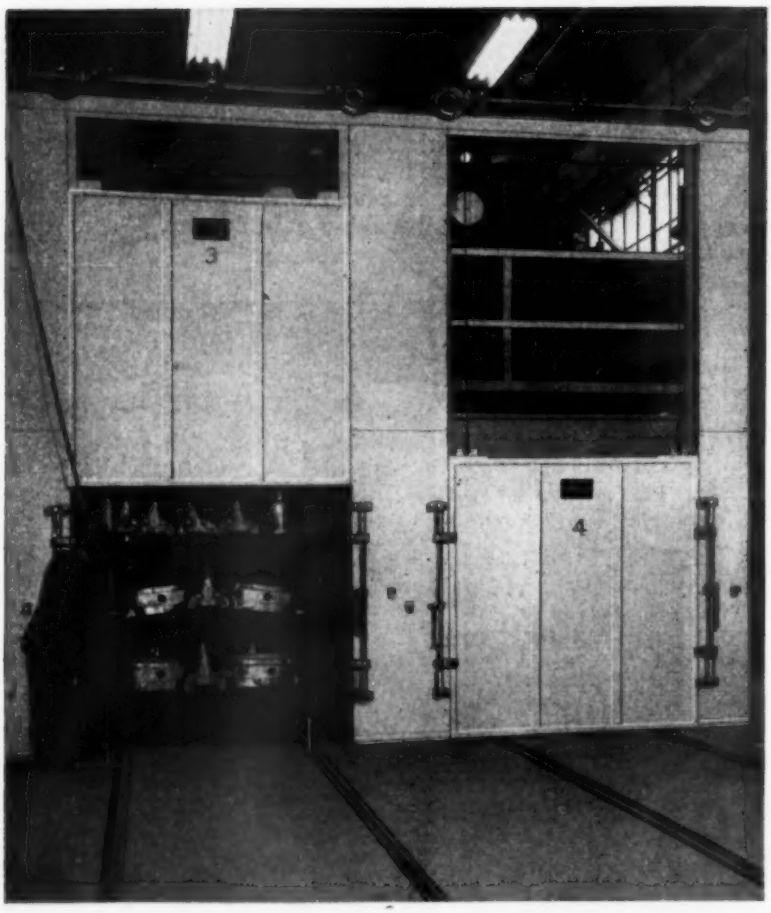


N. RANSOHOFF, Inc. CINCINNATI, OHIO
Township Ave. and Big 4 R. R.

CHART SHOWS temperature variations of not over 5° F.



For aging, annealing, bluing, drawing, tempering, normalizing— Maehler recirculating air heat furnaces are providing heat uniformity that is VIRTUALLY PERFECT. These units are the last word in efficient, low cost operation and are solving many of today's heat treating problems.



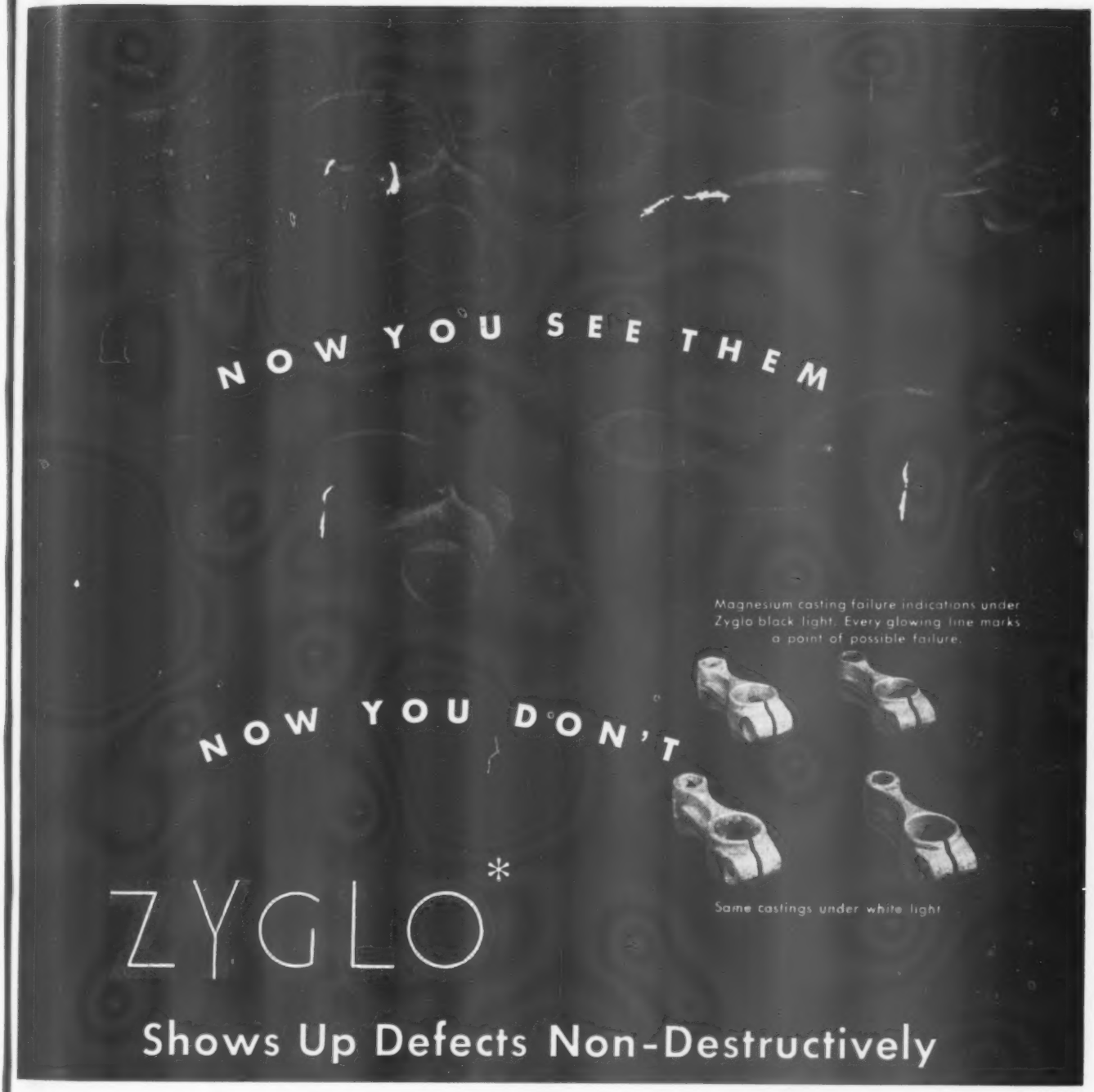
An example of how Maehler furnaces are being used for heat treating of magnesium is shown in the photo at the left. These Maehler recirculating air heat furnaces are two of the 46 Maehler units at the Howard Foundries in Chicago. The furnace to the right in the picture is used for aging magnesium castings at 350° F. Full capacity in this furnace is 4000 lbs. From a cold start it requires about one hour for ovens to reach the 350° temperature. The castings are aged for 16 hours. The furnace at the left is used for normalizing magnesium castings. This operation requires 6 hours at 450° F. Furnaces operate independently and are gas fired. Recent reports indicate that during both of these operations temperature chart variations of not over 5° F. are maintained.

Bring your heat treating problems to Maehler—you can do the job better, faster and at lower cost with Maehler furnaces —oil fired, gas fired or electrically heated units available for handling temperatures up to 1300° F. Call a Maehler engineer today or write for latest bulletins.

THE PAUL MAEHLER COMPANY
2260 W. Lake Street Chicago 12, Illinois

MAEHLER

Industrial Ovens and Furnaces for Normalizing, Stress-relieving, Bluing, Aging, Tempering, Annealing, Drawing, Etc.


NOW YOU SEE THEM
Magnesium casting failure indications under Zyglo black light. Every glowing line marks a point of possible failure.
NOW YOU DON'T
Same castings under white light
ZYGLO*
Shows Up Defects Non-Destructively

A simple Zyglo inspection under black light reveals cold shuts, shrinkage cracks, porosity, blow-holes and surface cracks with vivid luminous indications—so plainly that defective castings need not slip by. With Zyglo, foundrymen can hold back defective castings before they leave the plant and become troublemakers elsewhere. Zyglo is applicable to all cast materials.

The cast magnesium fittings in the pictures above show typical Zyglo indications of cracks which would probably cause failure.

Check your castings with Zyglo and be sure of the quality of every individual piece.

**Zyglo—the Trade Mark of the Magnaflux Corporation applied to its equipment, materials and inspection methods.*

MAGNAFLUX CORPORATION

MAGNAFLUX CORPORATION

5918 Northwest Highway, Chicago 31, Illinois

New York · Detroit · Dallas · Los Angeles · Cleveland · Birmingham

FANNER CHAPLETS

Whatever your CHAPLET requirements may be, there is a FANNER CHAPLET to fit the job.

THE FANNER MANUFACTURING COMPANY, CLEVELAND 1, O.

THE CANADIAN FANNER LTD., HAMILTON. ONTARIO, CANADA

156 Foundries Use Schneible Dust Control Equipment

Clean air in foundries has abundantly demonstrated its economic worth during this war production era. Less labor fatigue and greater production result from clean air in the working zones. In an ever-growing number of foundries, dust and fumes have been eliminated by Schneible Multi-Wash Systems.

Schneible dust collecting equipment is built to function indefinitely, with no attendance and a very minimum of maintenance. There is nothing complicated about a Schneible system—no screens, filters or bags to clean periodically—no parts to break, burn, clog or rapidly wear. The plain water used as the cleaning medium can be reclaimed and used repeatedly.

Numerous installations in outstanding foundries give proof of the efficiency of Schneible Multi-Wash Dust Collectors, which are the most economical in the long run because first cost is practically the only cost.

Standard Schneible units are available for alleviating every foundry dust and fume condition. May we send you complete details?

CLAUDE B. SCHNEIBLE CO.

2827 Twenty-Fifth Street, Detroit 16, Michigan

SCHNEIBLE

LIQUID-VAPOR INTIMATE CONTACT EQUIPMENT for DUST COLLECTION ABSORPTION CONDENSATION AND TEMPERATURE REDUCTION

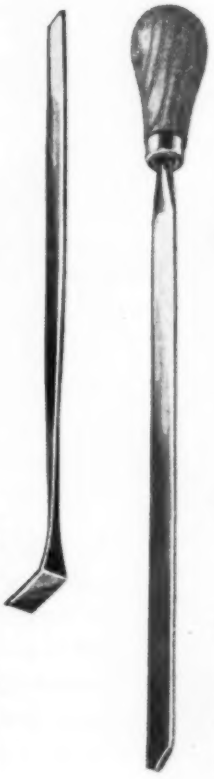
ONE PIECE FORGED TOOL STEEL

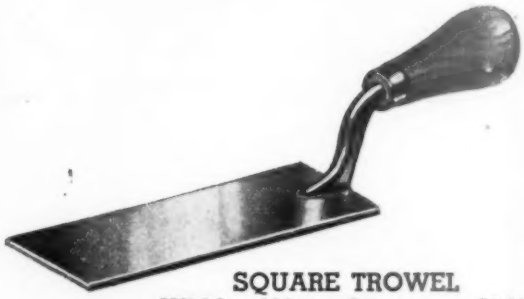
MOULDERS TOOLS

Immediate Delivery From Stock...

ROUND FINISHING TROWEL

Width—1½"	x 6"	$1.80
1½"	x 7"	1.85
2"	x 7"	1.90





SQUARE TROWEL

Width—1½"	x 6"	$1.80
1½"	x 7"	1.85
2"	x 7"	1.90

No. 40 STRAIGHT LIFTERS →

Length	10"	12"	14"	16"	18"
Width—¼"	$1.05	$1.15	$1.20	$1.30	....
⅜"	1.05	1.15	1.20	1.30	....
½"	....	1.30	1.35	1.40	$1.55
¾"	....	1.40	1.50	1.60	1.75

Special Lifter, ½" wide x 24" long — $2.50

←MOULDERS VENTING TOOL
For
Steel and Semi-Steel Foundries

Length	16"
Width—⅜"	$1.20
½"	1.35
¾"	1.50

No. 15 BENCH LIFTER	Width	Each
	¼"	$1.05
	½"	1.15
	¾"	1.40

Prices subject to change without notice. This is our complete line of tools. New tools will be added to this list when justified by demand.

No. 1
SLICK & OVAL SPOON

Width	¾"	1"	1¼"	1½"
Each	$1.05	$1.15	$1.40	$1.55

No. 5
OVAL SPOON & TAPER SLICK

Width	¾"
Each	$1.15

No. 10
TAPER & SQUARE

Width	¾" Taper, ½" Square
Each	$1.15

The Freeman Supply Company

Pattern Shop & Foundry Supplies & Equipment

Mahogany and Pine Pattern Lumber

1152 East Broadway TOLEDO 5, OHIO Tel. TAylor 4624

Industry Must Aid Returning War Veterans In Adjustment to Civilian Life

BY THIS time most industrial managers should be very familiar with the rights which veterans of the present war have to their old jobs. According to the Selective Service Act, ex-servicemen, who left their jobs to go to war, are guaranteed these jobs back, providing application is made within 40 days after discharge from the military services. While considerable criticism has developed regarding continuity of seniority and complete priority on these jobs, it appears that Selective Service is preparing to give a literal interpretation to the law, which will favor the veterans. Employers are beginning to find many complications in rehiring veterans, and these problems will increase greatly in the months immediately ahead.

But problems of the individual industrial organization are not confined to rehiring its own veterans. Due to circumstances beyond their control, or because men wish to better themselves, many ex-servicemen will not return to their former employment, but will seek new connections elsewhere. One of the dangers inherent in this situation was related recently by a company which had just hired two war veterans discharged from the Army for disabilities incurred in service. During the course of the interview the company learned that these men had tried unsuccessfully for several weeks to find work in the district, after circumstances beyond the control of their prewar employer had terminated jobs to which they had returned after discharge from the Army. The men added that they had become decidedly bitter the previous day when one employer, to whom they had applied for work, had turned them down with the remark that "if the Army doesn't want you, we don't either."

Of course this is an isolated case and is not typical. But the incident does emphasize the fact that all of the talk, laws and plans regarding veteran re-employment will count for little unless every company and each representative of management charged with the problem assume full responsibility in the task of returning to their proper niches in industry most of the millions of men who now constitute our armed forces. Industry has the golden opportunity of helping to win the peace by seeing that the veterans are given a square deal.

Since the beginning of the war there has been unanimous agreement that the "no job" signs, which greeted too many discharged men in 1919, must not be duplicated this time. But numerous employers seemingly have given the subject little further thought. To be sure they intend to give their former workers all the breaks possible when the latter doff their uniforms, and of course there is a law which promises the discharged veteran his old job. Therefore, the matter already is taken care of. Unfortunately, the problem cannot be dismissed so easily. The various points of the law, the interpretations of Selective Service, and the other ramifications of the problem must be studied carefully and a program developed which will prove equally satisfactory to the company and to the returning veteran.

Industry also must find an answer to the question of how best to employ those men who no longer are capable of performing their former work. Many men will return to industry with varying degrees of disabilities, and thus will be unable to fill their old jobs. This calls for an accurate analysis of the physical and mental requirements of the various types of jobs available in the individual plants, if the human side of the coming reconversion period is to be entirely successful. All possible steps must be taken to smooth the individual's readjustment from military to civilian life, particularly the physically handicapped. In this connection the Committee on Supervisory Relations of the National Association of Manufacturers has emphasized the important role that foremen should play in rehabilitation. Bertram G. Parker, president, Youngstown Foundry & Machine Co., Youngstown, O., and chairman of the NAM committee, recently stated: "The supervisor is perhaps the most important single factor in the satisfactory reabsorption of veterans in industrial jobs. After all, the foreman's attitude,. to a large extent, will determine the kind of adjustment that the veteran makes." Supervisory personnel must be trained to handle its end of re-employment.

Postwar planning of individual companies thus far seems to have been concerned primarily with products and production, and these of course are directly related to job opportunities. But unless the planning includes an adequate program of veteran re-employment and readjustment, millions of men will have cause for resentment. In that event, industry will become the principal loser.

Frank G. Steinebach

Editor

STEEL FOUNDRY POURING

The author discusses advantages and disadvantages of different types of ladles used in pouring steel, methods of correcting leaks in nozzles of bottom pour ladles, and proper operating procedure in pouring

AS THE manufacture of gray iron castings antedated by many years that of steel castings, it is probable that early steel foundrymen used the plain lip-poured ladles that are characteristic of gray iron practice. These are plain steel shells rather thinly lined for the most part with loam rather than brick. Lifted by a bail permanently attached at the trunnions they are as a rule tipped by means of a hand wheel and spur gear, and may have separate spout pieces attached to the shell at each side. The lining then is arranged so that a comparatively narrow and shallow groove is formed in the broad curve of the lip. As gray iron is extremely fluid and free flowing, the stream of metal running over the lip is easily confined to this spout area, and can be made larger or smaller at will.

What little slag accumulates in the iron ladle is skimmed off readily with wooden bladed skimmers, so that only clean metal is poured into the mold. Because iron has a low melting point, so that it does not tend to skull over in the ladle and retains its fluidity at comparatively low temperatures, it is common practice to pour iron from lip-pour ladles holding many tons of metal.

Steel differs in many respects from gray iron, and pouring practice for steel is affected necessarily by many of these differences. One of the outstanding differences is the higher freezing point of steel and its sluggishness as compared with gray iron at temperatures only a little above its freezing point. Since lip-pouring necessarily demands that practically all the slag be skimmed off the metal, and therefore the loss of heat to the air is at a high rate, it follows as an obvious corollary that the total time consumed in pouring the steel must not be too great, or the contents of the ladle will cool too much and begin to freeze over. Therefore, large quantities of steel cannot be lip-poured from one ladle into a great many castings because the total time of pouring would be too great.

In addition, even fairly hot steel does not run like iron, so that it is next to impossible to pour a small stream over the lip of a large ladle of steel. On the contrary, when the steel starts to flow over the lip, it forms a wide stream. For large gray iron castings this could be tolerated since it is common practice to pour the iron into a wide pouring basin on the top of the mold from which the iron is led down through one or a number of passages into the mold. The basin can be built out to the edge of the mold and is filled readily from even a large ladle. Steel, on the other hand, generally is poured into a funnel-shaped pouring cup on top of a comparatively small runner passage formed of sand or made up of tile brick. To pour a wide stream from a lip-poured ladle into such a runner cup without spilling a great deal of metal, would be difficult if not impossible. Moreover, the pouring cup commonly is located somewhere on the top of the mold at a point considerably removed from the edge, so that it would be exceedingly awkward to try to fill it from a large lip-poured ladle.

For all these reasons large heats of steel invariably are poured by means of a stopper and nozzle in the bottom of the ladle. However, small heats such as are used in the converter or electric furnace shops making light castings have not as a rule been poured through bottom nozzles. The exception to this rule in the United States appears to be the Milwaukee district where even very light heats are bottom poured.

Control Pouring Speed

There are certain advantages in lip-pouring small castings, chiefly in the matter of being able to control the rate of pouring. Many times it is desirable to allow the first metal poured to enter the mold slowly so as to minimize cutting and washing of the mold and disturbance of interior chills when they are used. When the bottom of the mold is full, it is the best practice to pour faster and then taper off when the steel is up in the heads, and finish pouring slowly. By so doing, a certain amount of the shrinkage of the casting is allowed to take place while the steel is running into the mold, and thus the entering metal helps to feed the shrinkage. This reduces the size of the sink-heads required. With a lip-poured ladle provided with extra lip pieces of proper shape to allow a narrow pouring notch to be made up, it is quite easy to control the rate of pouring. With a stopper and nozzle as will be described later, it is not possible to control the pouring rate completely, especially when pouring first starts and the ladle is nearly or quite full. Then the pressure on the nozzle is at its greatest, and the stream flows very fast.

The greatest disadvantage of lip-pouring ladles is the tendency of the metal to cool off too fast, and the difficulty of keeping floating particles of slag out of the molds. It is very hard to skim all the slag off a ladle of steel, and even when nearly all of it is removed, more tends to form

IN PRACTICE

By JOHN HOWE HALL

Various reasons make it desirable to pour large heats of steel by means of a stopper and nozzle in the bottom of the ladle. Lip-pouring ladles generally are preferred for small heats

from the attack of the steel upon the lining of the ladle. As it is usually necessary to hold back some slag, it is common practice to leave enough to just cover the steel in the ladle and keep it back by means of a long brick, or hard core floated on the metal to form a dam across the lip. The slag is quickly shoved away from the lip, the core dropped in and placed with a light skimmer rod, and what little slag gets in front of the core is skimmed off. This practice works better than using a metal skimmer held across the lip, and is quite successful with gummy slags such as those on converter or acid electric furnace steel. The more fluid slag on basic electric furnace heats usually has to be skimmed off clean before pouring is started.

Much of the steel poured in light casting shops, of course, is handled by means of small *shank* ladles filled from the main ladle, and these necessarily are lip poured. Customarily, these ladles are lined up with a dam built across the edge of the lip, with a hole through which to pour. These linings are rammed in around a form, and are made up commonly of ganister or silica sand mixed with clay and enough binder to give the necessary plasticity. The larger lip-poured ladles often are lined similarly, though a brick lining is more often used. It is not possible to use a built-in dam across the lip in these larger ladles, because it does not function properly when the level of the steel in the ladle drops. The core or brick which floats on the metal and follows the falling level in the ladle, is more workable.

Tendency of the steel in lip-poured ladles to cool too much has led to the adoption in most shops of the *tea-pot* ladle, which to a certain extent combines the advantages of lip-pouring and bottom pouring. They are not popular in some shops making austenitic manganese steel, because large castings of that metal commonly are poured of steel that is almost at its freezing point. If the steel in a tea-pot ladle is allowed to grow cold in this manner, the spout may be plugged up before all the steel is poured and require knocking out and relining after pouring only a few heats.

The spout of the tea-pot ladle is made up in a trough-shaped piece of steel shell on the outside of the main shell, and running from the lip of the ladle to a point near the bottom. This space is lined with brick or a rammed mixture, forming a spout which connects with the steel in the bottom of the ladle through an opening in the shell. Thus a tea-pot ladle takes the steel from the bottom rather than the top, and all the slag can be left on the steel, to keep it hot. What little slag gets into the spout while filling the ladle is removed with a skimmer before any steel is poured, and for the rest of the pour the slag in the ladle is effectively held back. A little forms from time to time by the attack of the steel on the lining of the spout, but on the whole it can be said that in pouring from a tea-pot ladle, there is no difficulty in keeping the slag from running into the molds.

The body of the metal in the spout of the tea-pot ladle naturally is much smaller than (*Please turn to page* 210)

Patterns of Gypsum

THE art of making models and patterns of gypsum cement is not new. It has been standard practice in the ornamental field for hundreds of years. Several large rubber manufacturers have made their master patterns of gypsum cement for the past 10 years. Their tolerances are held to 0.005 of an inch. The patterns made 10 years ago are still in perfect condition because normal atmospheric conditions do not affect them. Industry in general has used gypsum cement over a long period of time. The pottery industry uses gypsum cements exclusively.

Making patterns and models of gypsum cement has been given an impetus by the war. Attention has been focused upon the aircraft industry, one of the large users of gypsum cement patterns. The aircraft industry adopted gypsum cement because: It is stable—regardless of climate; it is accurate; and a large number of highly contoured patterns can be made speedily and easily. The variety and scope of the patterns and models that can be produced using the basic information contained in this article is unlimited. It depends upon the skill and ingenuity of the craftsman to adapt the methods outlined to specific jobs.

Much information about the use of gypsum cement is not based on fact. Unsound methods have been devised that cause mediocre results because the basic and physical characteristics of gypsum cement were not thoroughly known by the craftsman.

Gypsum cements are made from a natural mineral, gypsum rock either white or gray. The rock is ground to

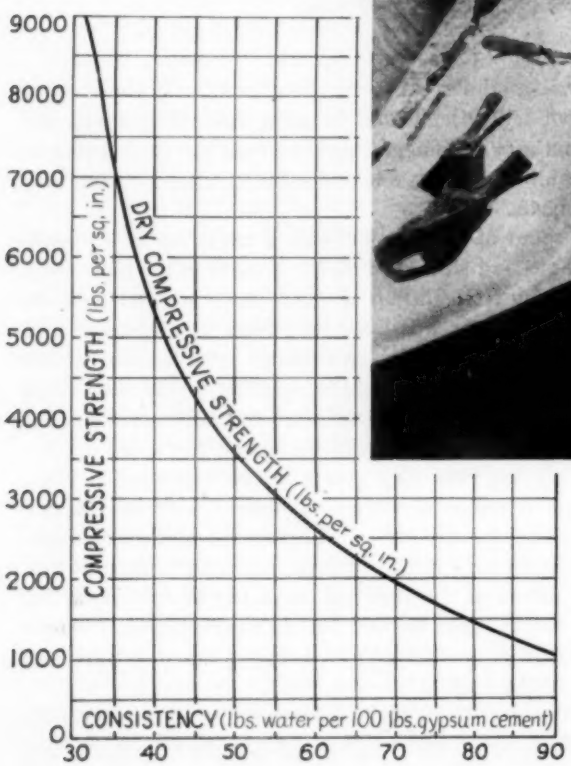


Fig. 1 (left)—Chart showing effect of consistency on strength of gypsum cement casts

Fig. 2 (above)—Corner of a large pattern shop devoted exclusively to making extremely accurate patterns of gypsum cement. Men in foreground are doing handwork on built-up patterns

Fig. 3 (right)—Examples of principal tools used in making patterns. Although mostly of special types they are easy to make

Gypsum Cement

By E. H. SCHLEEDE
Industrial Division
United States Gypsum Co.
Chicago

The war has given considerable impetus to use of gypsum cement in making patterns and models. This is the first of two articles explaining steps in successful production of patterns from this material.

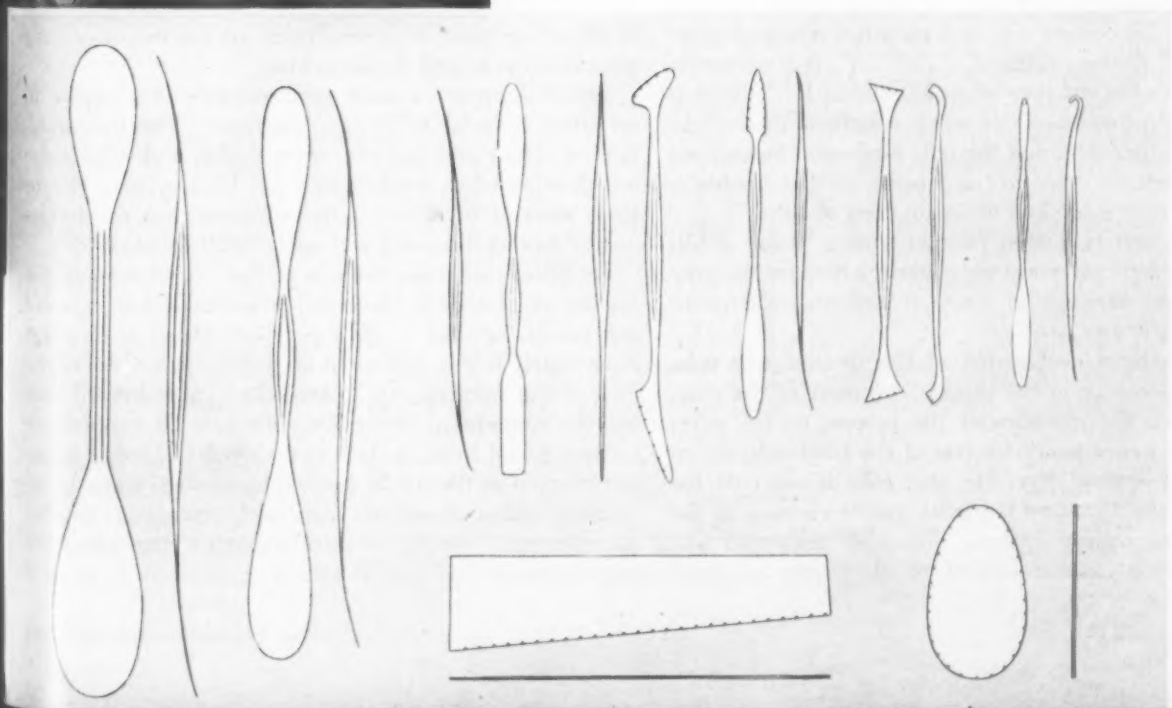
a fine powder and properly calcined to obtain a uniform product. By controlling calcining and further processing, predetermined characteristics are produced. Constant research and improvement in manufacturing technique have developed basically different products to meet requirements and wide range of special properties.

When mixed with water, gypsum cements form plastic masses which can be molded, shaped, or cast. The plastic mass begins first to thicken, then harden and then set. The thickening or creaming stage varies in length of time with different types of cement. To the patternmaker this thickening stage is the most useful, interesting and phenomenal and is described accurately as the period of plasticity. During this period the cement can be formed by hand, screeded (shop term for forming) with a templet, and reinforced with hemp, sisal, wire mesh, expanded metal, burlap or muslin. The various stages of the period of plasticity should be observed closely by the patternmaker, because specific results can be achieved *only* at certain stages.

This valuable period frequently is neglected to the user's disadvantage. During this period the cement should be used to build up patterns and to screed them to shape with templets. At this time it can be modeled readily, since it has a controlled flow and thus eliminates the need for molds or boxing-in, which would be necessary if the material was used in the free flowing state.

A little experience and study quickly will show how the progressive plasticity of the cement may be utilized. Different areas of the pattern will require different stages of plasticity, because as the plastic period progresses, the cement gains strength or body, and can be built up to the required contours. Length and character of the plasticity period varies with different types of gypsum cement.

When a gypsum cement is mixed with water and the fluid mixture changes to a solid, certain volume and temperature changes start with the initial set. These changes include setting expansion and thermal expansion. The thermal expansion recedes as the heat of crystallization leaves. The setting expansion is permanent. Setting expansion varies with each type (*Please turn to page* 224)



Coke Properties and Cupol

By B. P. MULCAHY
Research Engineer
Citizens Gas & Coke Utility
Indianapolis

CHEMICAL equations frequently are disconcerting and misleading and this is particularly true in the case of combustion within the cupola. However, no operator can disregard the necessity for thinking in terms of the few reactions which so forcibly affect iron quality. Speed of melting in the cupola is so much faster than in other types of furnaces that unless control is exerted from the start, deviations from the desired results are almost certain to occur.

In this discussion the prime objective has been to let factual operating data lead the theory rather than the reverse, which so often is done. At the same time, there is no digression from theory in the development of why in actual practice 108 cubic feet of air is used to burn 1 pound of coke in contrast to 150 cubic feet of air generally quoted.

Conclusions drawn with respect to the direction of reactions and path of travel of gases are associated directly with the imprint left on the cupola itself and the character of iron produced. Here again, factual conditions point the way to the interpretations, and the mechanisms discussed are based upon evidence from actual practice.

The fundamental objective throughout the discussion is an assignment of responsibility to the factors, which because of similarity of effect, are constantly being misinterpreted. The theme, therefore, is the critical inspection of the inherent properties of coke which affect and are affected by the process of cupola melting.

SPECIFICATIONS of cast iron and cast steel by chemical composition has long been outmoded. . . . . it is necessary to evaluate and specify cast iron by its mechanical properties, as tested on specimens representative of the size of section being cast," and

"It is the task of the production engineer to guard the quality and uniformity of the product, by setting up suitable production control tests and records. A wrong process can spoil the best material. . . . . It is axiomatic that there is need for process specifications, for indicating and recording instruments to catch variations that would otherwise go unnoted, and for tests made and inspections exerted at suitable steps in the process, so that trouble is caught before it is too late to do anything about it."

The foregoing is quoted directly from a recent publication by Gillett[1] and concisely states the case for the gray iron industry, although in intent it embraces the entire metal industry.

Although the subject matter of this discussion is coke and its influence upon the process, we must at the same time evaluate the influence of the process on the coke. This is vital to our understanding of the fundamentals involved for we must remember that coke is not only the fuel but it also furnishes the most mobile element in the entire process namely, carbon. We must remember too, that this same element carbon in all ferrous products originated almost entirely from coke. This forcibly directs our attention to the solubility of this element, but at the same time we should recall its ease of oxidation and consequent loss.

It is this dual role of coke which has caused most of the misunderstanding concerning its performance and it is for this reason too, that the coke manufacturer always has occupied the conspicuous seat of blame for the mal-performance of many cupolas.

This discussion will be confined to by-product foundry coke since it is the principal fuel used and the inclusion of the limited quantities of the other types consumed would only confuse an already complex process. When these other fuels are used for the same purpose of melting, the principles outlined still will apply.

To properly evaluate the influence of coke characteristics in cupola melting we must consider first the imposed conditions, extraneous to the coke, surrounding its combustion, and these we first will review briefly.

Structurally the cupola is a comparatively simple melting unit, consisting of a refractory lined shaft, equipped with a series of tuyeres located close to the bottom for the introduction of air for combustion. Connected with the tuyeres is the wind box, an annular enclosure receiving the air from the blower. The wind box is actually an expansion chamber to serve the purpose of equalizing the pressure to each tuyere. All dimensions vary in accordance with the particular demands of capacities and other factors and some of these variations, of course, exert greater influence than others on the overall characteristics.

Fig. 2 illustrates a static representation of a cupola in operation reduced to its simplest form. The interpretation of results and behavior in operation will need some modification when applied to a hot blast system, two or three rows of tuyeres or other additions, but the fundamental factors discussed will apply to all cupolas.

Air introduced from the side of the cupola through the tuyeres must change direction in order to flow upward and out of the stack at the top. This change of direction immediately leaves its imprint on the size and shape of the area of the burning coke. Ascending gases formed during the combustion of the coke decrease in temperature in their travel from the bed to their point of exit. Material charged at the top is descending through zones of increasing temperature and constantly changing gaseous compositions. Finally the metal reaches a zone where the gases from the bed have sufficient temperature to cause it

Melting

The first of two articles especially modified and adapted by the author for publication in THE FOUNDRY from a paper he presented before the American Foundrymen's Association

to melt. This metal, made molten immediately above the bed, drops through the bed at different rates across its area in direct accordance with the different temperature conditions resulting from the unequal distribution of air through the bed. Zone of maximum temperature in the bed heats the metal to its maximum temperature and the metal finally reaches the well, from which it is withdrawn as desired.

Physical aspects of the process consist in charging the coke and raw iron into the cupola for as long as it is desired to melt, but once the coke is ignited and the melting process is under way, our chief concern must be with the chemical reactions taking place, not only in the combustion of the fuel, but also in the effect these reactions have upon the iron composition and resultant physical properties.

One of the most unfortunate conditions surrounding this whole problem of cupola operation is the practice of drawing conclusions from average results. This must be done advisedly because of the several overlapping influences at work. If we wish to improve the process or the metal in any or all respects we must concern ourselves with the correct mechanisms, the probable paths of reactions and above all the reasons for them.

Most important chemical reactions occurring within the cupola are those involving the (*Please turn to page* 202)

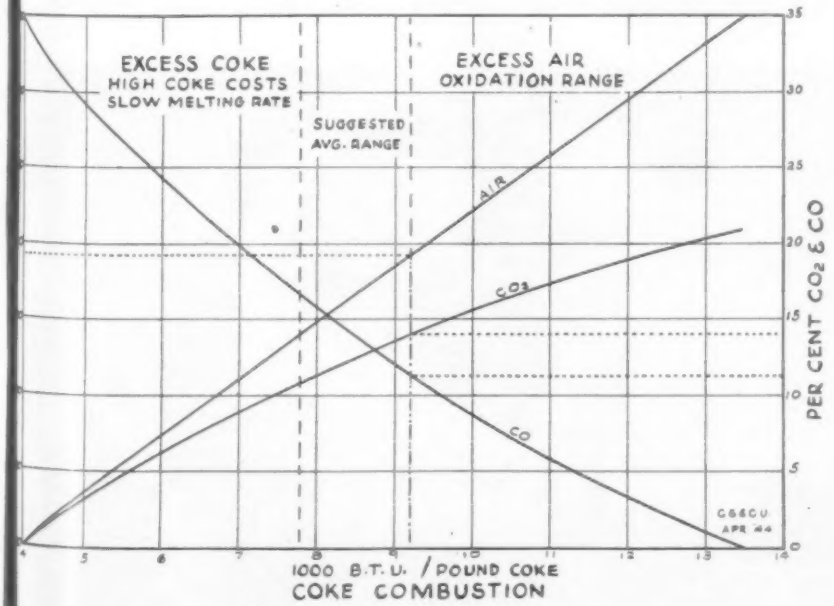
Table I—Analyses of Cupola Gases

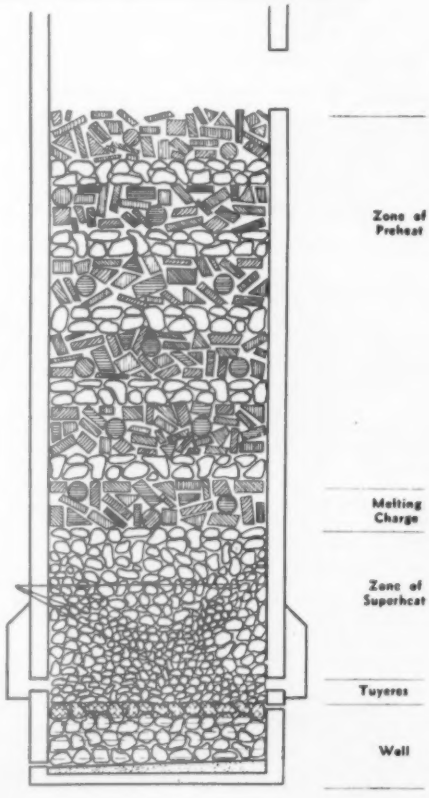
Plane	Location	CO_2	O_2	CO
A.	1	12.0	0.2	14.2
	2	10.3	2.1	14.0
	3	4.5	15.8	0.2
B.	1	13.1	0.1	12.4
	2	12.5	0.3	12.9
	3	11.5	8.9	0.5
C.	1	11.9	0.1	14.4
	2	12.8	0.1	13.2
	3	15.0	4.9	1.0
D.	1	9.8	0.0	18.1
	2	11.5	0.0	15.4
	3	16.9	0.4	4.8
E.	1	8.6	0.0	19.9
	2	10.1	0.0	17.1
	3	15.2	0.1	6.8

Table II—Coke Combustion

Gas Analysis Per Cent by Volume CO_2	CO	Cu. Ft. Air Per lb. Coke	Total B.t.u. Per lb. Coke Burned
21.0	0	140	13,450
19.7	2.1	132	12,520
18.3	4.5	126	11,580
16.6	7.1	118	10,620
15.0	9.9	112	9,680
13.0	13.0	104	8,740
10.9	16.6	98	7,820
8.7	20.3	91	6,850
6.1	24.6	84	5,910
3.2	29.4	77	4,970
0	34.7	70	4,020

Fig. 1 (below)—Chart showing gas analysis for different quantities of air and heat released per pound of coke. Suggested average working range of CO_2 is 11 to 14 per cent. Above this range the metal may oxidize; below coke economy is poor, melting slow, carbon usually high. Fig. 2 (right)—Static representation of cupola in operation reduced to its simplest form





Efficient Utilization of COMPRESSED AIR in The Foundry

COMPRESSED air has contributed enormously to the making of better castings and cheaper castings, and, as a result, the use of compressed air in the modern foundry is on a very large scale and growing consistently as more applications are developed. Naturally, this in turn results in cheaper equipment, of which castings are a part. Defective castings are a matter of considerable expense, as they are usually rejected after they have been largely machined, so that not only is the casting itself a loss but also much labor in the machine shop has been lost before the defect usually discloses itself. Efficient utilization of compressed air is one of the really important phases of the foundry art.

There are approximately 4800 foundries in the United States, and each in itself has its own particular problems of air utilization. Yet, the fundamentals governing the efficient use of compressed air are much the same in all foundries.

Efficient use of compressed air in the foundry may be broken down into the following phases:

1. The compressed air plant.
2. Proper size and arrangement of air piping and receiver layout.
3. The greatest utilization of compressed air devices so as to benefit from the most modern practice in the art.
4. The proper maintenance of the entire compressed air system, including the piping, receivers, etc.
5. The proper maintenance of the various foundry devices that use compressed air.

The compressor plant—In view of the dirt and grit often present in the foundry atmosphere, it is essential that care be taken to house the compressor in as clean a room as possible. An efficient filter on the intake is definitely a "must" in a foundry installation, and care must be exercised to take the air for the intake from the cleanest source available. Definite time schedules should be set up for cleaning the filter as well as changing the oil in the compressor crankcase, taking into account the fact that these must be done more frequently in a foundry installation where dirt and grit will penetrate in some measure even though the working parts are enclosed. Manufacturer's instructions should be followed as regards quality and quantity of lubricating oil, cooling water free of scale, and in the maintenance of the mechanical parts of the compressor.

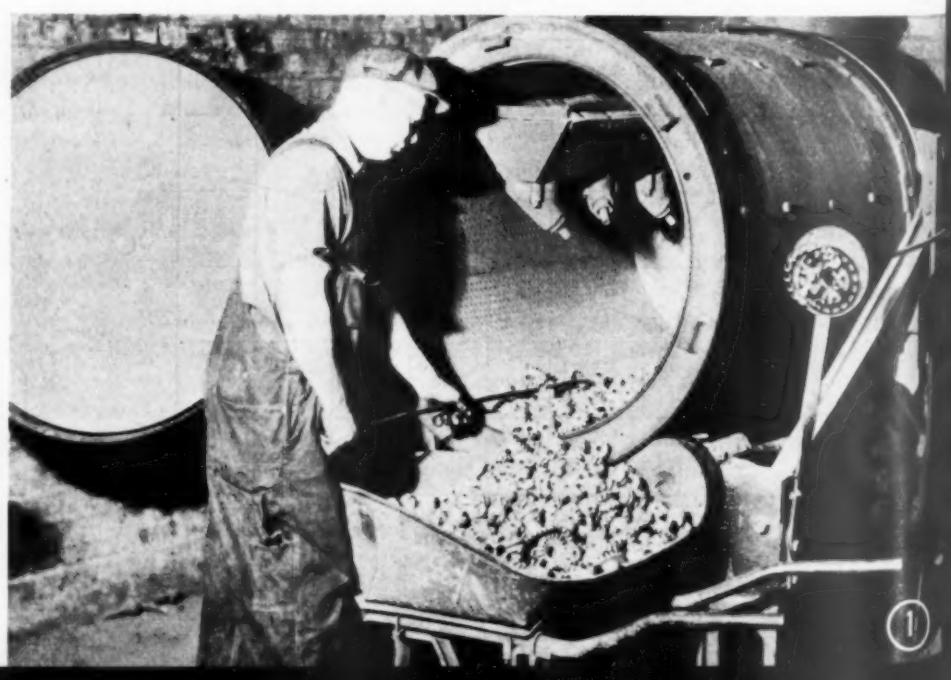
It is important in the installation of a compressed air plant in a foundry that an aftercooler be installed to eliminate moisture in the compressed air. Water in compressed air used in the foundry is not only injurious to the many compressed air devices used but is also undesirable in the proper operation of much foundry equipment, such as core blowers, etc., which demand an absolute minimum of moisture in the air supplied, since if there is any present it tends to increase the moisture content in the sand delivered to the mold. Close control of foundry sand delivered to a core blower may be entirely defeated by use of compressed air not free of water. Air used in blowing off dry sand molds prior to coring up must be as dry as possible, hence the necessity for use of an aftercooler in a foundry installation. The aftercooler should be placed as near as possible to the compressor discharge and between the compressor and the

Fig. 1—Sand blast machines and other equipment using large quantities of compressed air should be as close as possible to compressor plant to avoid long air lines

Fig. 2—Chart showing loss of air pressure due to pipe friction

Fig. 3—Grinding casting in foundry of agricultural machinery manufacturer

Fig. 4—Compressor plant in large foundry showing clean surroundings and indicating high type of maintenance

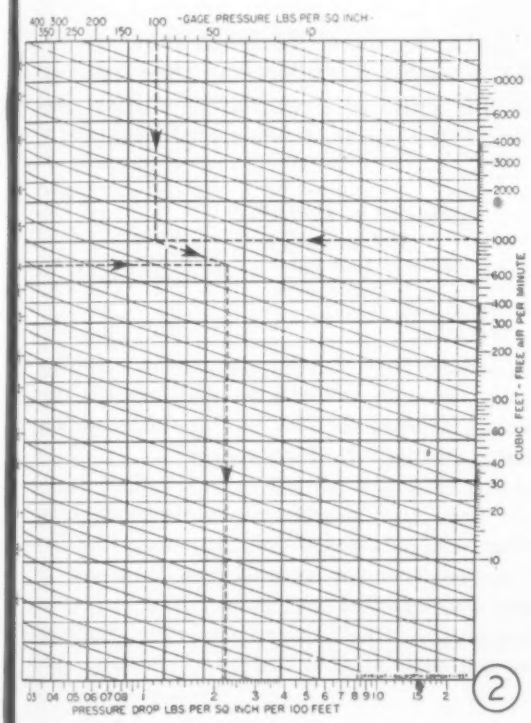


By J. L. YATES
Construction Engineer
Buffalo Works
Worthington Pump & Machinery Corp.

air receiver for more uniform and satisfactory operation.

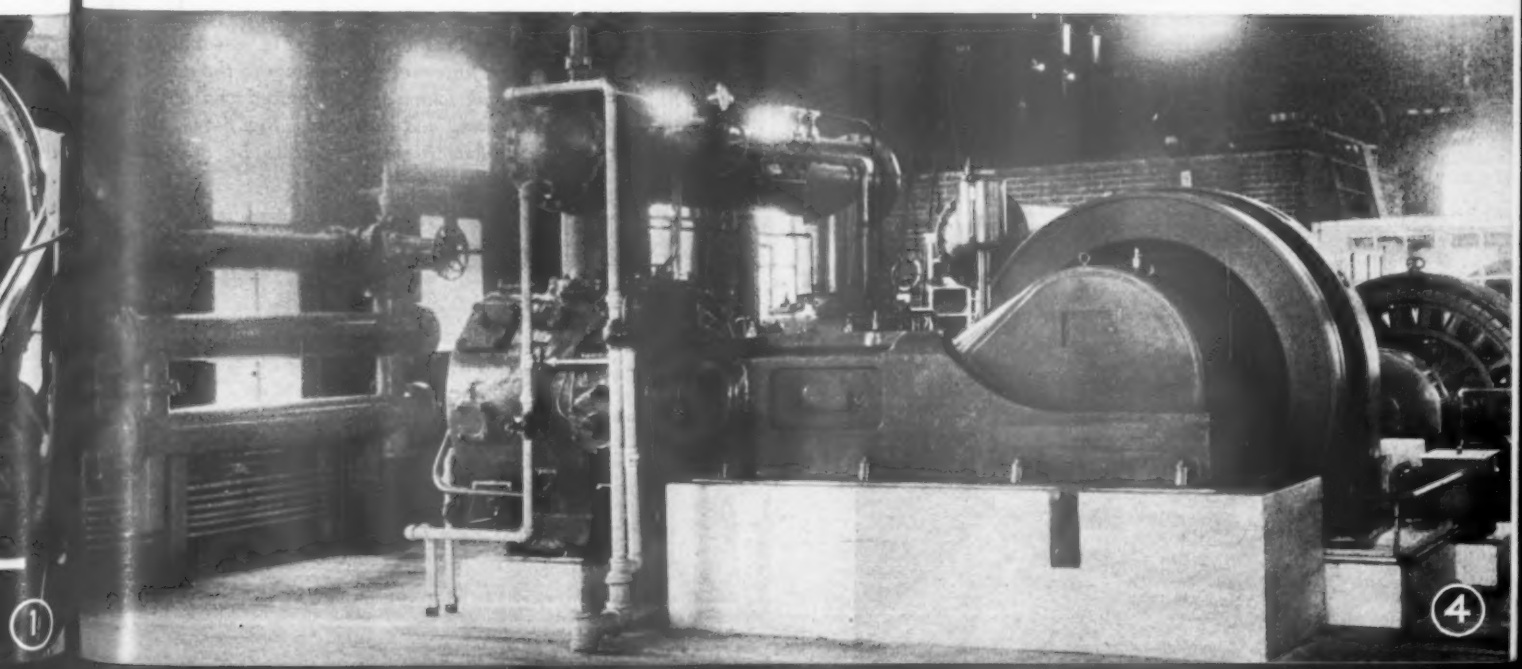
Air Piping and Receiver Layout—Particular care should be taken in designing the compressed air piping in order that excessive pressure drop will not result. Pneumatic rammers and other tools will work far more efficiently and develop a more effective ram to the mold if pressure can be obtained up to normal. It is estimated that low air pressure due to restrictions in piping and air hose results in slowing down the effective work by 25 per cent or more. It is quite absurd to compress air to 100 pounds in the power plant and dissipate 20 per cent or more of the energy through friction in a poorly designed distribution layout.

Pressure drop due to friction may be ascertained by means of the chart shown in Fig. 2. Suppose one wishes to determine the drop in transmitting 1000 cubic feet of air per minute at 100 pounds per square inch gage pressure through a 4-inch standard weight pipe. Entering the chart at the top at 100 pounds (*Please turn to page* 238)



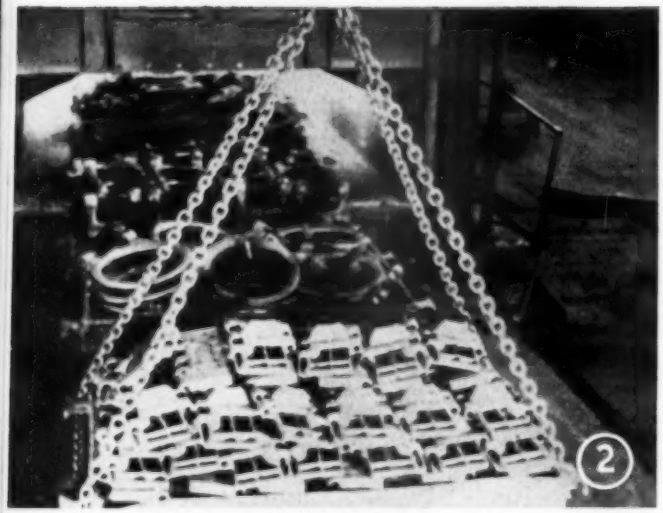
2

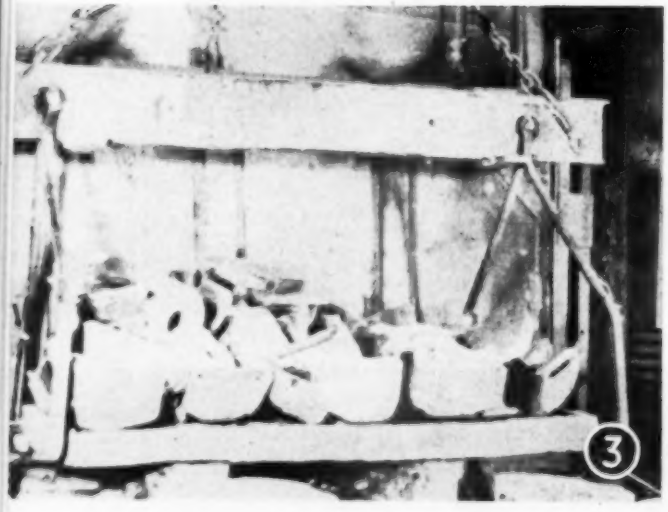
3

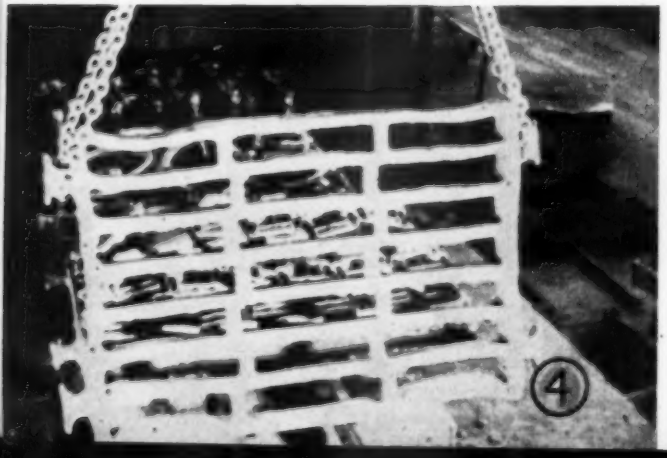


1

4







FACILITIES FOR Water Quenching Steel Castings

Furnace equipment and quench facilities that are required for effective water quenching of steel castings are discussed in this sixth and concluding paper presented before the Steel Founders' Society of America

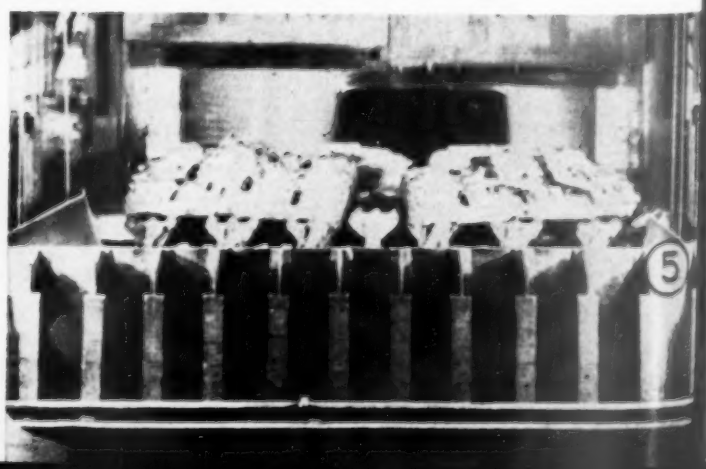
By R. H. SWARTZ
Chief Metallurgist
Ordnance Steel Foundry Co.
Bettendorf, Iowa

WATER quenching of steel castings is a subject of wide divergence of opinion, and certainly one which has been slighted by the metallurgists, engineers, and particularly by foundrymen.

When one searches the periodicals and other literature, he soon finds how scantily the subject has been covered. It has been only a very few years since foundrymen, much less engineers or buyers, have consented to consider water quenching of steel castings.

At the beginning of the present war when England was entering the tank program and our arsenals were

Fig. 1—Batch type furnace suitable for heat treating large castings. Fig. 2—Trays operated by chains in semicontinuous quenching operation. Fig. 3—Bail type of lifting mechanism for conveying castings to the quench. Fig. 4—Loading rack which is well spaced and latticed to provide good heating and quenching. Fig. 5—Castings from a semicontinuous furnace ready to be quenched



writing up specifications, it was stated very plainly on all prints, "Do not liquid quench." The specifications as written were tied completely to chemistry and physicals and no choice of treatment was given to the producer. Practically overnight, however, the chemistry limitations were removed, and physicals in all cases became the factor for acceptability. How to get them was your problem.

It was at this time that the Ordnance Steel Foundry started to develop quenching equipment and to make steel that would take a drastic water quench. Some foundries were in fair shape to handle quenching, having had a few customers who demanded the additional features attainable only in quenched steels.

Without doubt what has been brought about by the armament program in the progressive development of steel castings has been successful only because of the water-quench, which process will continue during peacetime when demands become even more exacting than they are now. A strenuous training period has been experienced from the standpoint of manufacturing better castings as regards extremely close soundness, specification, and machinability tolerance, as well as development of equipment to handle the quenching. This has been good, for the steel casting industry certainly was far behind the wrought people in the "know how" on making and treating steel castings that would compare with the forged and rolled products.

Industry Is Ready To Meet Demands

The industry has a long way to go before it can rest on its accomplishments, although the job so far has been well done. With the experience of the past few years in the war program, and with evidently still more to come, the industry is ready to meet the added demands put upon it now, as well as the postwar demands for castings. It is going to tax all facilities when the normal ways of business return, to put steel castings in their rightful place and keep them there.

There are customers who have never previously used steel castings, and engineers on the drawing board who have learned for the first time that steel castings can really do the job. This newly gained knowledge and acquaintance with cast steel products afford an opportunity to expand as never before. However, it will be necessary to compete with other types of castings and with wrought steel products.

The answer to these threats of encroachment, of course, is better castings, both structurally and physically and, in general, lighter and better designed castings. These are possible only with good steel, proper combination of alloys, the best of heat treatment, and the employment of good equipment. There is certainly a wealth of ability on the steel making end; but the type of steel and the type of heat treatment can be fitted together to better advantage if the best possible use is made of the facilities that have been developed and are still being developed, for the handling of the quenching of steel castings.

In any discussion of water quenching three factors are to be considered: (1) type of steel, (2) furnace equipment, (3) lastly but extremely important, the quench facilities. It is the last named factor with which this discussion is primarily concerned. One should be equally concerned with the quench as with the heat, if not more so. Taking for granted that the heating unit has the castings above the upper critical for the proper time, there is no factor more important than that of being able to quench as you wish and to duplicate this condition as often as desired. Too frequently the quench is merely a method of haphazardly cooling the casting in order to have some test piece or specimen in a state that will pass some required physicals.

Today's and tomorrow's castings require a good deal more. Casting must be quenched as individual specification articles. Every casting must stand on its own merits. Averages or "close-to's" are out. A casting partially quenched, or not uniformly quenched, should be air-cooled. The purpose of quenching steel after heating is to produce hardness or other desired metallurgical properties. These properties are dependent upon the type

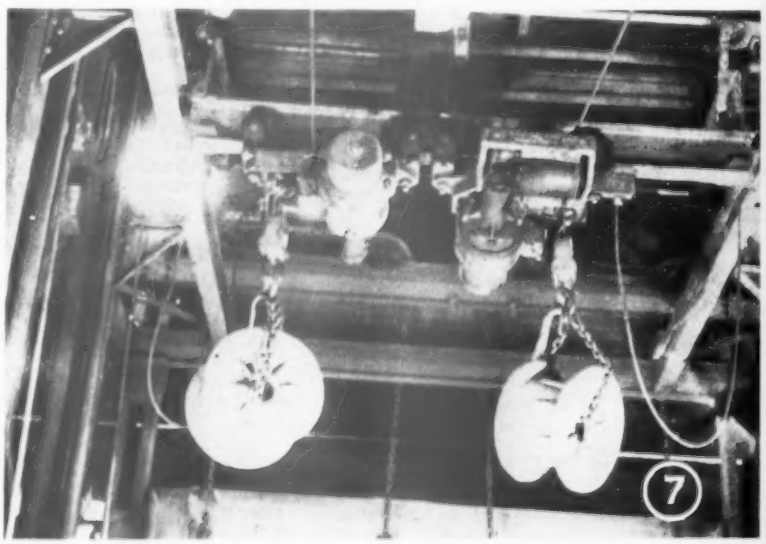
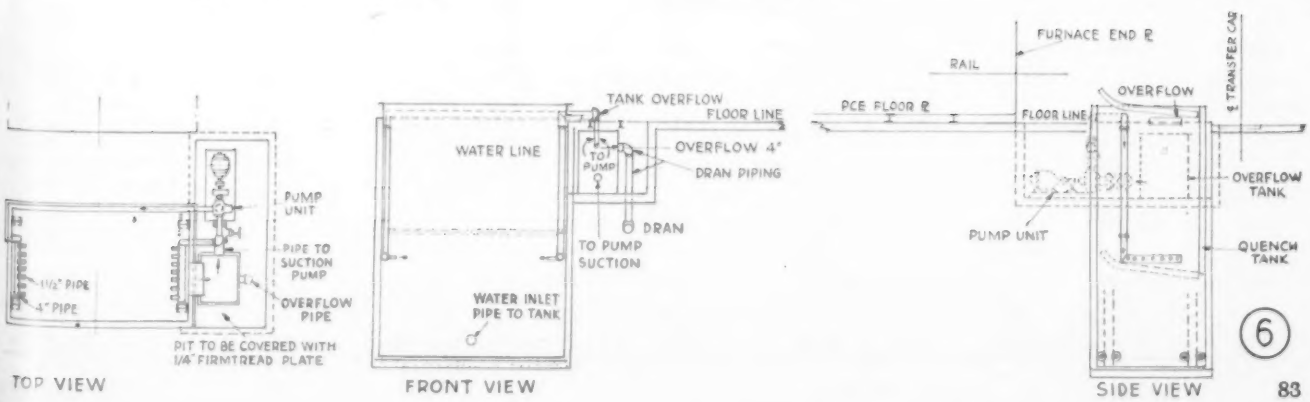
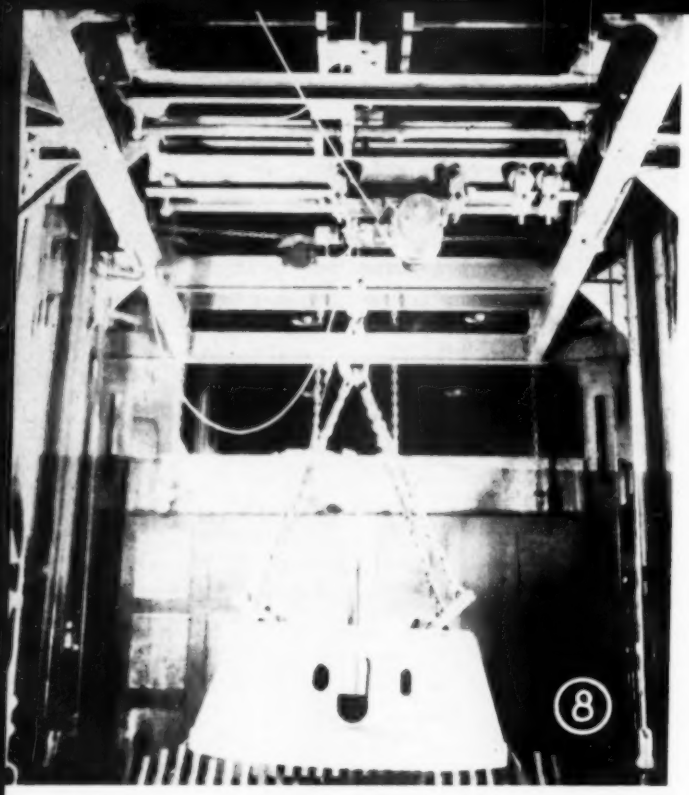


Fig. 6—Sketch showing details of a typical quenching tank. Fig. 7—Castings being removed from the quenching tank by overhead cranes





of cooling throughout the complete cooling range and, as described by H. J. French, "The rate of cooling at the highest temperature provides the 'will to harden' while subsequent cooling rate determines the degree to which hardness takes place."

A steel casting attains its maximum hardness when it is "quenched out" or when it has become martensitic in its entire structure. To do this, the center of the heaviest section must be cooled at a rate greater than its critical cooling rate. A good guide for studying the critical cooling rate is provided by H. Scott in his paper, "Some Problems of Quenching Steel Cylinders" in the *American Society of Metals Handbook*, 1933.

It was stated that first the type of steel is important. This is true both from the standpoint of mass and of chemistry. Every type of steel has a critical cooling rate necessary to harden it fully. Also, every steel composition must be studied from the standpoint of its heaviest section. A change of carbon or alloy content generally moves the nose of the S-curve (*Please turn to page* 230)

Fig. 8—Details of quenching equipment for large castings

TABLE I

Co. No.	Quench Load lb. Single Items	Tank Size Gal. Water	Water Circulation gal./min.	Water Quenching Tank Requirements: Additional Agitation	Quench Temp. deg.	Time: Sec. To Open Doors & Quench	Quench Water Temp. Prior to Quench deg.	After Quench deg.	Quench Time —min.— "IA"	"LO"	Max. Section in.	Temp. Removed Casting deg.
	16 200	2,000	None	1,650	30	110	115	3	8.5	4.25	400-600
	6,700	8,100	1,500					2.5	6	3	150-300
	100	4,100	600					2.25	4.5	2.13	150-300
								2	3	1.5	
								1.5	2	1	
								1.5	1.5	0.75	
2	5,000	4,000	400	Up and	1,525	35 to	50 to	110 to	3		2	400-500
	500	196	91	down thru		45	60	120	2		1.5	400-500
				bath					1.25		1	400-500
									40 sec.		0.75	400-500
3	5,000	12,000	1,200	Horiz. mo-	1,550	60	80 to	90 to	6		4.25	Water temp.
	to			tion to			90	100	7		3.25	to 250
	8,000			and fro					4		2.13	Water temp.
									4		2	to 180
4	5,000	12,000	1,200	Horiz. mo-	1,650	60	80 to	90 to	4.50		4.25	Water temp.
	to			tion to			90	100	3		3.25	to 600
	8,000			and fro					1.75		2	Water temp.
												to 500
5	6,500	24,000	2,000	Up and	1,625	90 to	80 to	85 to	5		3	350
				down thru		100	85	90				
				bath								
6	14,000	9,600	400		1,575	3 min.	80 to	100 to	5		4.25	Under 600
	22,000	17,000	450				100	120	4.25		3	Under 500
	22,000	20,000	500						3.5		2	Under 500
	20,000	23,000	600						1.5		1	Under 500
	24,000	33,000	840									
	20,000	45,000	1,200									
7	5,000	11,000	2,000	Up and	1,700	....	....	.....	....		....	.....
				down thru								
				bath								
8	6,400	9,500	2,500	None	1,675	18	100±5	120 to	15		6	Under 500
	85,000	66,400	5,000			18		125	5		4	Under 500
	6,400	10,000	1,000			25			4		3	Under 500
	11,400	20,000	1,750									
9	12,000	11,000	2,000	None	1,600	50	80 to	100 to	1.5		2	350-500
							90	110	1		1.5	350-500
									0.75		1	350-500
10	1,500	10,000	2,000	Nozzle	1,600	20 to	110 to	110 to	2.5		2.5	400
	1,500	10,000	2,000	flow at		25	140	140	2		1.5	400
	4,000	12,000	2,000	equal inter-					1.5		1	400
				vals at sides								
11	6,000	11,000	3,000	None	1,625	30	50 to	60 to	3		2	300
							60	70	1.5		1	300
12	4,000	10,770	1,600	Horiz. mo-	1,640	60	80 to	90 to	3.75		4.25	500
				tion of			90	105	2		2.13	300
				casting								
13	6,000	13,000	3,200	Pres. noz.	1,650	25	75 to	85 to	3		2	350
				bottom &			85	100	2		1	350
				sides								
14	6,000	7,800	2,700	None	1,680	15 to	70 to	100 to	6.5		3	300-400
	6,000	7,800	2,700		to	35	90	110	5.5		1.75	300-400
	6,000	7,800	2,700		1,700							
15	4,000	3,800	347	None	1,600	30	55	80	2		2	700

How to Melt BRONZE

Equipment for melting and precautions to observe in practice are described in this second and concluding part of a paper presented before a conference of the Eastern Canada and Newfoundland Chapter of the A.F.A.

By A. E. CARTWRIGHT
Chief Metallurgist
Robert Mitchell Co. Ltd.
Montreal

YELLOW brass usually is made from individual metals, copper and zinc. Adding 5 to 10 per cent of the zinc to the cold charged copper is the best way to start melting. When these are melted the remainder of the zinc is added followed by the small amounts of tin and lead usually included in cast yellow brasses. The small amount of tin and lead may be added cheaply to the original cold charge as scrap red brass. Considerable difficulty is experienced in pouring yellow brass and the higher zinc naval brass or muntz metal into molds without inclusions of zinc oxide dross. This difficulty is entirely overcome if 0.1 per cent aluminum is added before the metal is poured. The aluminum forms a protective film of aluminum oxide over the surface of the brass. The film remains unbroken even as it pours over the lip of the crucible and prevents the formation of bulky zinc oxide when the alloy is in contact with the atmosphere.

Handling brasses high in zinc has special problems owing to the fact that the pouring temperatures for brass usually are as high or higher than the boiling point of zinc. No other metal in common use has such a low boiling point as zinc. Below its boiling point, zinc is no more troublesome in control of oxidation than the other metals but at the alloying furnace temperatures in brass and bronze practice, zinc vaporizes and immediately is converted to zinc oxide when the vapor comes in contact with air. As a useful addition to the glass-borax cover used for all bronzes, common salt is employed for yellow brasses and manganese bronzes. Salt melts and vaporizes at somewhat lower temperature than zinc and the vapor pressure of the salt vapor reduces the tendency for zinc vapor to escape. However, in humid weather the vaporization of salt is uncomfortable to the furnace operator.

Manganese bronzes and aluminum bronzes are made most reliably by melting certified ingot metals or, as noted previously, by adding a hardener to copper, or copper plus zinc for manganese bronze.

Turning now to the melting process, the majority of bronze is melted by crucible furnaces of one kind or another. Until about 20 years ago, most bronze was melted in coke-fired crucible furnaces and even today a considerable amount is melted by this means. The crucible is supported on a bed of coke and surrounded by coke, which is fired with natural or artificial draft. To obtain a high temperature, it is necessary to provide a considerable excess of air. Improper control will cause trouble through oxidation, gassing, or cold metal. Because of the excess air required in coke-fired melting, it generally is necessary to place a good charcoal cover on top of the metal in the crucible. The excess air will oxidize and burn the charcoal before it can affect the metal.

More recently, the use of oil and gas as fuel has become generally popular. The cost is higher but better quality and quicker melting results from the more efficient combustion of the fuel by the more perfect proportioning of oil or gas and air.

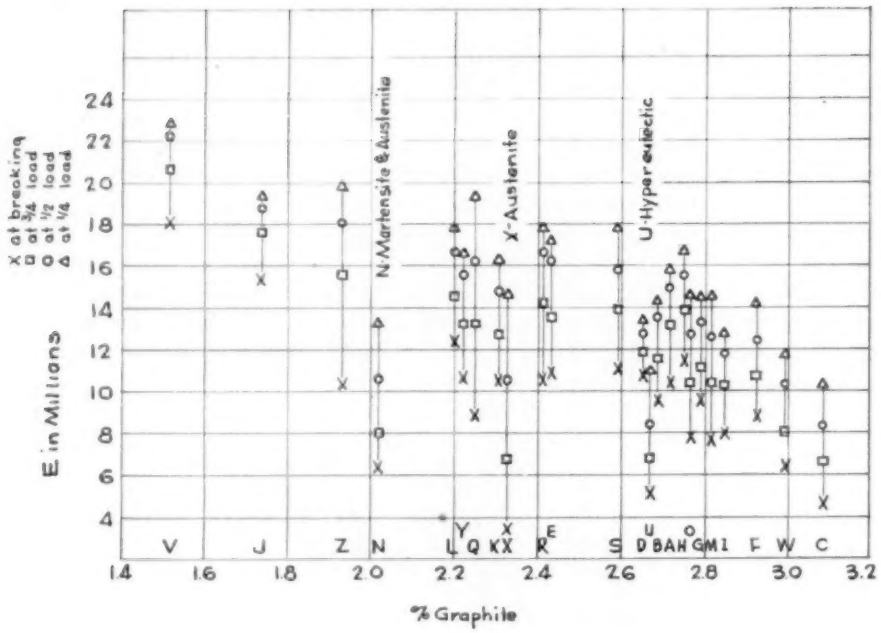
Crucibles usually are made of a refractory grade of graphite mixed with other refractory material and bonded with some such cementing material as water-glass (silicate of soda). They are expensive, representing one of the largest items in total melting cost.

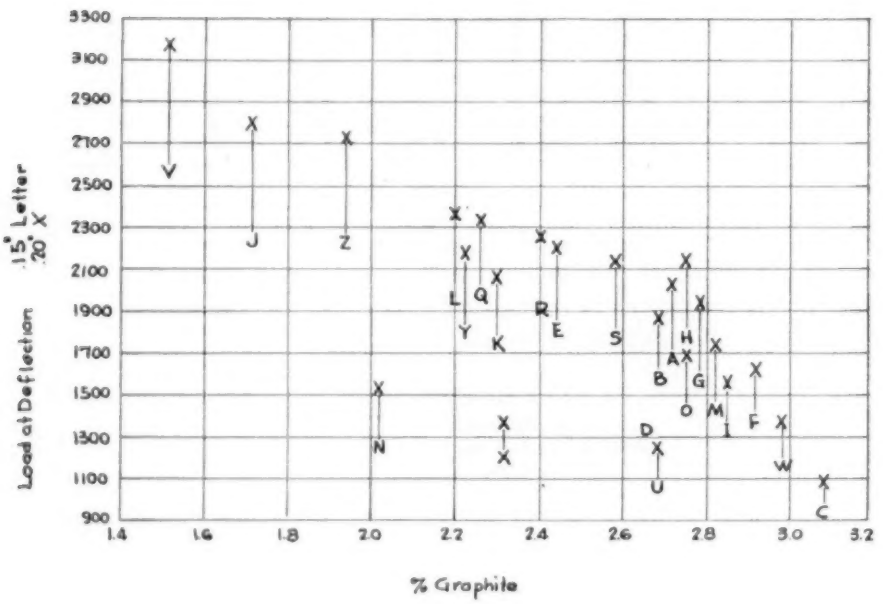
Proper care or careless treatment can cause low or high cost of operation. New crucibles always should be given a preliminary drying at 250-300 degrees Fahr. immediately before use in melting, and then heated gradually to 1300-1400 degrees Fahr. before charging any metal.

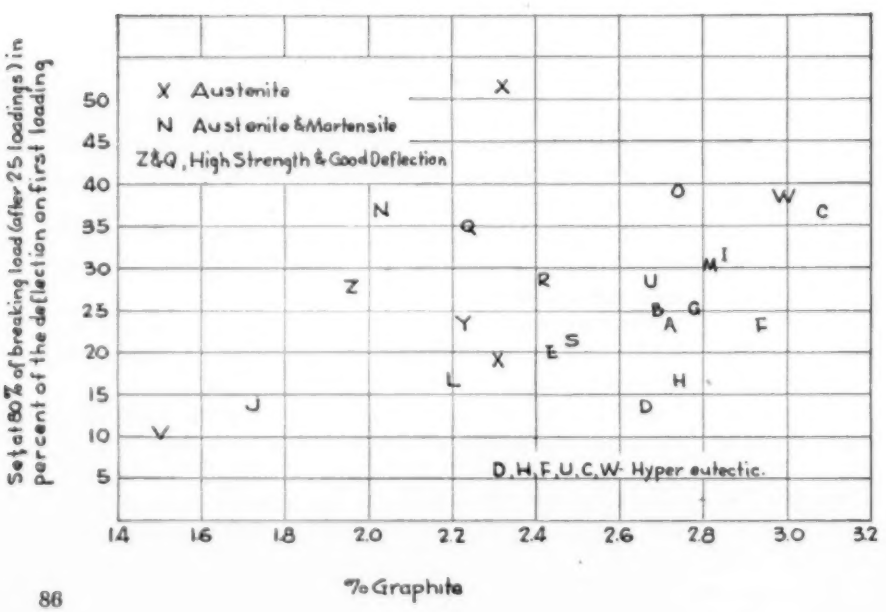
In lifting the crucible containing the melted charge from the furnace, the tongs must fit the contour of the crucible accurately. Localized pressure is very damaging, particularly as the crucible is much weaker at the temperature of the molten alloy contained in it than it is at ordinary temperature. Any slag or coke adhering to the side or bottom of the crucible must be removed carefully, not by rough hitting or chipping.

A hot crucible must not be allowed to stand on a cold surface, metal or concrete, but should be bedded into a warm sand support.

Crucibles must be emptied completely or replaced in the furnace for further melting. Metal never should be allowed to freeze in the crucible. When finished for the day, it is advisable to put the empty crucible back into the furnace and allow it to cool slowly with the furnace. In charging, the ingots or returns should not be wedged into a crucible. Expansion of the metal as it is heated will strain and crack the cru- (*Please turn to page* 216)






Set at 80% of breaking load (after 25 loadings) in percent of the deflection on first loading
X Austenite
N Austenite & Martensite
Z&Q, High Strength & Good Deflection
D, H, F, U, C, W- Hyper eutectic.
% Graphite

Gray Iron-

USING the rich fund of data contained in the Report of Sub Committee XV previously mentioned, there are illustrated in the next few figures some of the relations between graphite and the strength and stiffness of gray iron. Fig. 18 shows in capital letters the relation of tensile strength to graphite content for the 24 irons of the investigation and in small letters the ratio of the modulus of rupture to the tensile strength. (The identification letters of the original report have been used as a convenience to anyone wishing to refer to the other data on these irons.) In the lower figure the "out of line" irons are *V*, hypereutectoid; *N*, austenite + martensite; *X*, austenite; *D*, hypereutectic with 2 per cent phosphorus; and *U*, hypereutectic with 3 per cent silicon. The upper figure shows that while the graphite reduces the bending strength, it does not reduce it proportionally, as the ratio rises owing to increasing displacement of the neutral axis. For example: at 51,000 tensile (iron *J*) the ratio is 1.9 and the modulus of rupture is 92,500, while at 20,000 tensile (iron *I*) the ratio is 2.45—a modulus of rupture of 49,000. Thus, for gray iron, an increase of 155 per cent in tensile strength is accompanied by only 90 per cent increase in bending strength.

These results are on machined transverse as well as tensile bars. Where the transverse is not machined, as in the usual comparisons, the decrease in ratio of modulus of rupture to tensile strength is even more pronounced. A survey of the published results of the 10 years from 1922 to 1932 showed

Fig. 14 (*top, left*)—*Relation of secant modulus of elasticity to graphite content. Fig.* 15 (*center*)—*Relation of stiffness to graphite content. Fig.* 16 (*bottom*)—*Relation of set to graphite content*

By JAMES T. MacKENZIE
American Cast Iron Pipe Co.
Birmingham, Ala.

Steel plus Graphite

Concluding the Howe Memorial Lecture presented at the New York meeting of the American Institute of Mining and Metallurgical Engineers. First and second parts appeared in August and September issues.

the results listed in the accompanying Table I.

Thus for as-cast transverse bars against machined tensile bars, an increase of 200 per cent tensile (from 17,500 to 52,500) gave an increase in modulus of rupture of only 65 per cent (from 40,000 to 66,000). Obviously, as the graphite decreases in size and amount the surface is increasingly sensitive to stress raisers. The same thing is true for compressive strength and much the same pattern is shown for the shear.

As a measure of the stiffness of cast iron, the somewhat misnamed "secant modulus of elasticity" has been used. This is simply a substitution of the load and deflection in the conventional beam formulas and, while it has very little relation to the true modulus of elasticity of the

Table I—Ratios of Modulus of Rupture to Tensile Strength

Tensile Strength	Number of Tests	Average Ratio
15,100-20,000	8	2.27
20,100-25,000	22	1.89
25,100-30,000*	11	1.67
30,100-35,000	19	1.88
35,100-40,000	10	1.72
40,100-45,000	14	1.55
45,100-50,000	7	1.38
50,000+	5	1.26

*The group of 11 tests between 25,100 and 30,000 averaged much higher phosphorus than the other groups.

mathematicians, it is a very useful quantity. Fig. 14 shows how this quantity varies inversely with the graphite, the exceptional irons again being *N*, *X*, and *U*. The change in the values for the different degrees of loading gives a very good idea of the curvature of the bending curves. A direct quantity, long used in specifications for cast-iron pipe, and quite simple when using a standard bar, is the load at a certain deflection. This can be read directly while making a test and does not require an autographic or other recording of the whole curve. Such a study is made in Fig. 15, which gives the loads at 0.15 and 0.20-in. deflection of the 1.20 × 18 round bar. Again, *N*, *X* and *U* are farthest out of line and *D* is low (*D* did not bend 0.20 in.). In fact, the average deflection of the set was only 0.141 in. so the maximum (1316 at 0.149) was used in the graph.

The plastic component of the deformation of gray iron is due to local stresses above the yield point of the matrix and is a function of this yield point and the amount, size, shape and distribution of the graphite. It is commonly called "set."

The relation of set to the amount of graphite is shown in Fig. 16. The out-of-line irons are noted on the graph. *U*, *W* and *C* probably would have been up on a line with *Z* and *Q* had it not been for primary graphite, which reduces the strength out of proportion to the softening of the matrix, so the local yielding of the matrix was not taking place at the load used. Set occurs mostly on the first few applications of the load and after that the iron seems to behave with almost perfect elasticity. A typical case of a medium iron (2.9 per cent graphite) is given in Table II on the following page.

A similar iron was loaded as follows:

Loading No.	Set, In.
1	0.015
3	0.019
60	0.023
240	0.025
373	0.022

The bar showed little change after the third loading. If, however, the bar be loaded above the point previously stressed it behaves almost exactly like an unstressed bar from a little above that point. For the impact report, above cited, a study was made of the set of all of these irons at 20, 40, 60, and 80 per cent of the bending strength. Each bar was bent 25 times to the first load point, then 25 times to the second, and so forth. After the twenty-fifth loading to 80 per cent, the load was released and the bar was broken as in the usual test. On the first loading to each point, a bending curve was taken. Fig. 19 shows the comparative curves for *Z* and *X* when the set curves are assembled, as described in the report.

Some of the more useful functions of the graphite are difficult to evaluate numerically. Because of the brittleness of the chip and the lubricating properties of the

Fig. 17—Difference between internal damping capacity of cast iron and steel as indicated by Foeppl-Pertz machine

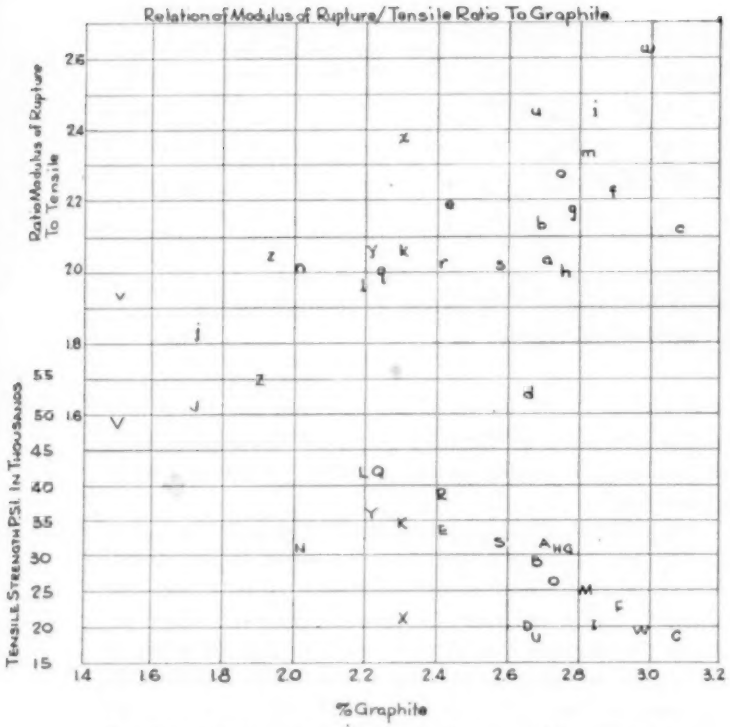

Relation of Modulus of Rupture/Tensile Ratio To Graphite
Ratio Modulus of Rupture To Tensile
Tensile Strength PSI. In Thousands
% Graphite

Fig. 18—Relation of tensile strength to graphite content

graphite, gray iron is easily machined. As Professor Boston has shown, it is the easiest ferrous material to machine at any given hardness level. The graphite undoubtedly is responsible for its freedom from galling. As Mochel has pointed out, it does not gall when run on itself or on many other metals which are notorious for their galling tendencies. The graphite flakes also act as cushions against thermal shock and thus prevent crazing. Gray iron, therefore, is the only material that has been successfully used, at least on a large scale, for brake shoes or brake drum linings, which must absorb tremendous energy, convert it to heat, or noise, and still not "seize" the wheel or axle. This lack of galling tendency combined with the oil-retaining ability and the actual lubricating action of the graphite is also probably responsible for the excellent wear resistance of gray iron. These properties, not cheapness, are the reasons for the large use of gray iron by the automotive industry.

Another credit to gray iron is its almost complete insensibility to the notch effect. Prof. H. F. Moore showed that a specimen of cast iron with a radial hole which should have reduced the endurance limit 67 per cent actually reduced it only 13 per cent. Two other specimens tested with filleted grooves, which should have reduced the endurance limit 74 per cent, actually showed 0 and 8 per cent reduction. Prof. J. B. Kommers tested one soft cast iron with a square notch and got an increase of 500 lb. per sq. in. in the endurance limit.

The high damping capacity of gray iron is entirely due to the cushioning effect of the graphite. Damping capacity is closely related to the acoustic resistivity of the physicists and is mathematically expressed as $u = \sqrt{Ep}$, where E is Young's modulus and p is density. Considerable work has been done on this property using the Foeppl-Pertz machine. Typical diagrams of gray iron and steel are shown in Fig. 17. The sound of a bar is that portion of the diagram reaching the ear. One of our wartime laboratory workers, a cellist by profession, became interested in the relation of pitch to stiffness and became able to predict, with considerable accuracy, the modulus of elasticity by the pitch of the tone given by the test bar when struck by a hammer. Inasmuch as the modulus is an inverse function of the graphite, it is also an inverse function of the damping capacity. The Meehanite Research Institute, for example, in a tabulation of properties of its various grades, lists the relative values for Young's modulus and damping capacity (expressed as the energy dissipated in the first cycle of a torsion test at 20,000 lb. per sq. in.) as follows:

Modulus of Elasticity	Damping Capacity
23,000,000	21
21,000,000	24
19,000,000	25
17,500,000	28
15,000,000	30
12,000,000	32

Thus in many cases a softer iron—i.e., one with more graphite—would stand vibratory stresses better than a stronger iron.

Professor Howe said: "Graphite itself is source of weakness and brittleness. Its presence is sought rather for process than for product purposes." This was before the automobile had taught the value of gray iron in resistance to wear and galling and before autogenous welding had proved that strength and rigidity alone could not overcome vibration in heavy, high-speed machinery. I believe that were Professor Howe alive today he would be the first to recognize the value of the material, Steel plus Graphite.

Table II—Set No. 1120

Loading	Deflection, In., at 1500 Lb.	Loss of Deflection, In., at 1500 Lb.	Set by Gages, In.
No. 1	0.287	....	....
No. 2	0.260	0.027	0.026
No. 3	0.247	0.040	0.036
No. 4	0.246	0.041	0.041
No. 7	0.246	0.041	0.043
No. 21	0.243	0.044	0.044

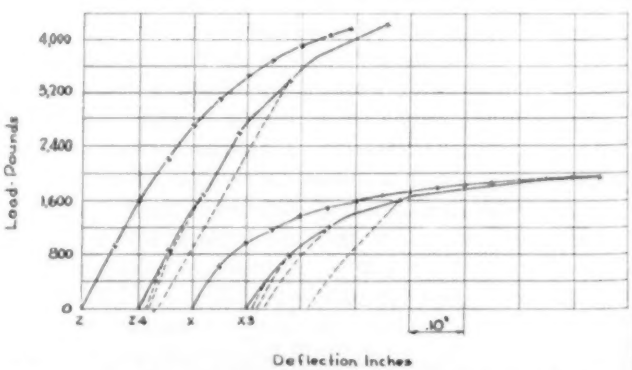


Fig. 19—Effect of repeated loading on load-deflection curves of cast iron

KNOW YOUR COSTS

A large part of the ills of the gray iron foundry industry is attributable to poor cost methods, according to the author in his address before the recent Chicago regional conference of the Gray Iron Founders' Society

By WILLIAM M. CALDWELL
Assistant to Executive Vice President
Gray Iron Founders' Society

HOW can the gray iron foundry industry help itself? To those who clamor for better working conditions, higher wages, more labor-saving machinery, more plant capacity we answer questioningly: How can these things be done? Within reason, all these things have been done. The gray iron industry as an industry, has done a good job in these respects; but to make further and large-scale improvements along these lines entails considerable expenditure. Whence are the funds to come? There are but two sources: borrowed capital and surplus. Many foundries, because of declining profits, have had to exhaust surplus to pay current bills.

With increasing costs and frozen prices, surpluses just cannot be built up. Wages have been increased to the breaking point. The society's recent survey of 96 critical gray iron foundries indicates that wages have been increased an average of 22 per cent. That represents an increase of approximately 10 per cent in total costs. Consider that fact in relation to an average profit margin of 4 per cent and you can see just where the industry stands. Further increases in labor rates can come only from advances in prices granted on application to the Office of Price Administration. But this procedure is slow and costly, and records generally show that relief from this source is inadequate, insufficient in many cases to cover the wage increase.

As a consequence, profits in the gray iron foundry industry continue to decline and surpluses have become a thing of the past. The average foundry, therefore, would find it quite difficult to finance improvements from surpluses.

What about borrowed capital? Many foundries have exhausted the possibility of borrowing additional money; their credit has been expanded to the "elastic limits." Is the banker interested in your good record of production of parts for military vehicles, machine tools, invasion pipe lines, ships, planes? Is he interested in your desire to improve working conditions by providing more and better sanitary conditions, recreational facilities, rest rooms, cafeterias? I doubt it. He has the obligation to see that the funds are returned with interest; his chief concern is your ability to meet your obligations.

Management also must consider the risk elements involved in such transactions. If labor-saving equipment is installed, can the expenditure be recovered within a reasonable time? Can the equipment be utilized effectively after the war? These and many other questions must be answered satisfactorily. Government terms on borrowed capital, while somewhat more liberal, also have definite limitations. For these reasons, it is unlikely that capital expansion can help the average foundry.

If the gray iron foundry industry is to increase production, it must have relief from ceiling prices, and it must have sound prices based on sound costing. I do not prospose to pull punches. I believe the industry is at fault for a great deal of its present grief. I dare say that less than 25 per cent of the industry knows costs on individual castings. Generally speaking, if a gray iron foundry has any cost system at all, it grew out of a maze of general accounts, without rhyme or reason; and I am not singling out the smaller plants. The ignorance of many a large foundry of the subject of cost accounting is appalling. In a former connection with the Office of Price Administration I was in a position to know a great deal about gray iron foundry costing and pricing methods.

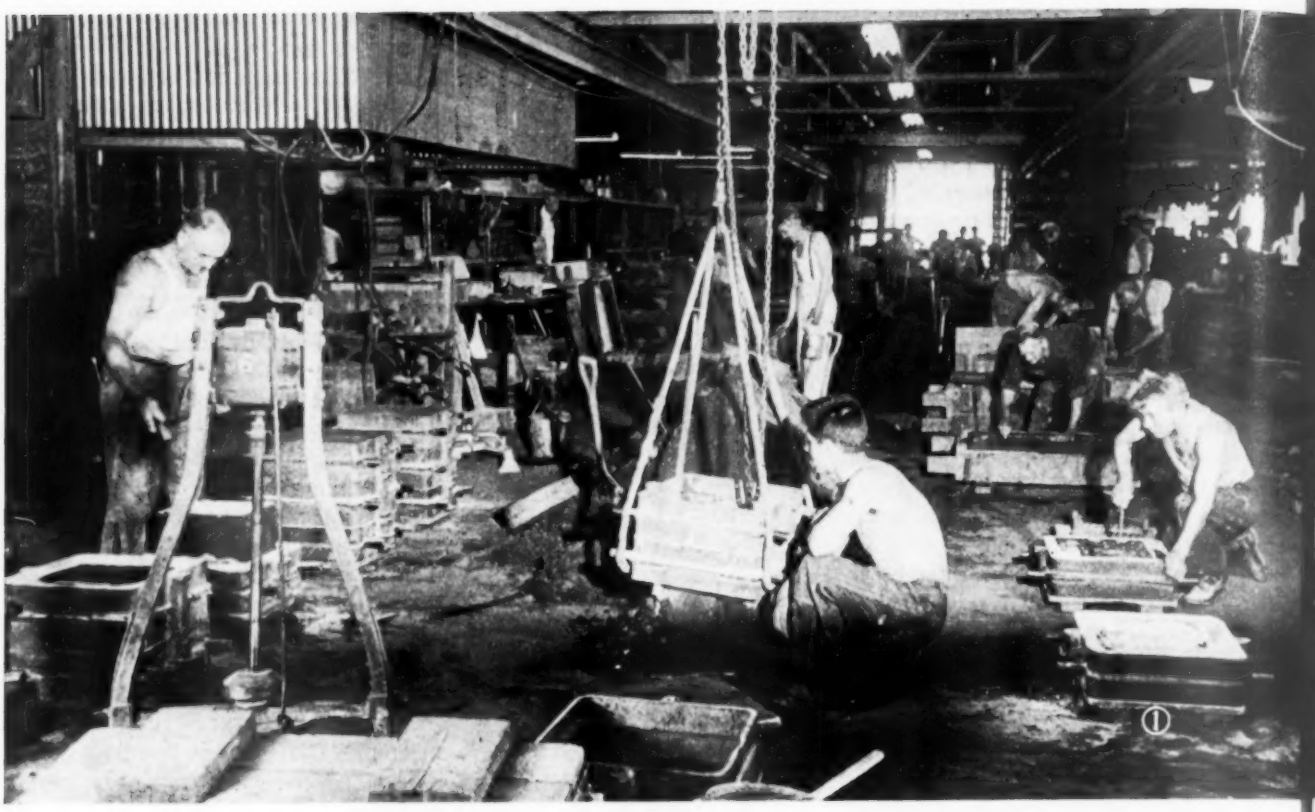
Prices that do not reflect total costs plus a reasonable profit can lead only to ruin. The foundry that sells below a level which reflects total cost plus a reasonable profit threatens not only its own security but that of the entire industry; and it is my belief that disregard for sound principles of pricing has done more to retard the progress of this industry than all other causes combined.

One cannot modernize plant and equipment without adequate reserves which must come from profits. Unless actual cost of production on individual castings is known, you surely handicap your operations.

If you look to the Office of Price Administration for relief, you are faced with the same barrier—net costs of product That office requires, on applications for adjustment of individual castings prices, that the applicant file detailed costs of production. Actually I have had foundrymen tell me they were unable to file such applications because they did not know their costs. Thus these companies stand to jeopardize their financial position for the lack of a cost accounting system.

There is another good reason why the gray iron foundry industry should iron out the kinks in its cost accounting system now. Within the coming year it is expected that many war contracts will be terminated. Both prime and subcontractors will be called upon to substantiate their claims for finished and semifinished work. And these claims cannot be supported by poor accounting procedures. In disputed cases the courts can but recognize standing accounting practice.

Now, if the gray iron industry is to meet the present demand for castings, it must look to its prices. Prices must be adjusted to reflect true costs plus a reasonable profit. Cost must be determined ac- (*Please turn to page* 208)



Convert Garage into a

By PAT DWYER

TO PARAPHRASE slightly a more or less familiar quotation, "Some men are born foundrymen, some men become foundrymen, and some men have the foundry business thrust upon them." Obviously the case of men born in a foundry, figuratively speaking, or of men who voluntarily become foundrymen, requires no explanation. They fulfill a natural destiny. In the words of certain writers in the dead and gone Victorian era, they accept a sphere in life to which they have been appointed through the inscrutable design of Divine Providence. A little more latitude is allowable when one contemplates the career of men who have had the foundry business, like a maverick child, laid on their doorstep with a note pinned to the flimsy blanket: "You can have it. And I sure wish you luck!"

For illustration, attention is directed to Robert B. Bonner, president, treasurer and general manager, Bonner Foundry Co., operating not one but two nonferrous foundries in the city of Cambridge, Mass., well known to one and all as the home of Harvard University, M.I.T. and other cultural institutions, and geographically and primly separated from the neighboring city of Boston by the width of the Charles river.

Casting about in his youth for a suitable point of embarkation on the flood tide which leads to fame and fortune, young Mr. Bonner, with a natural flair for and appreciation of figures, animate and inanimate, enrolled in one of the cultural institutions and in due course emerged with a diploma which testified to the fact that he was now a properly qualified and competent journeyman public accountant. Obviously the next logical step was to find a person, business, or institution public or private suffering from an overdose of indigestible figures and therefore urgently in need of the skilled services of an up and coming young figure juggler. A man who could take a quick look at a balance sheet and immediately spot any Ethiopian lurking in the woodpile. Where no figures existed, except maybe a few scattered notations on scraps of wrapping paper, backs of playing cards or discarded racing forms, he was prepared to install a set of nicely ruled books and instruct the new owner of said books how to keep them in a manner that would show whether he was making money, losing money, or just working for the exercise.

Over a comparatively short period our young Horatio built up a flourishing practice and enjoyed the confidence

Fig. 1 — General view of aluminum foundry engaged in production of miscellaneous line of castings. Core-making section at left. Fig. 2 —Cleaning room is equipped with saws and grinding wheels for removal of fins, gates and risers. Fig. 3— Each molder pours his own work

a Foundry

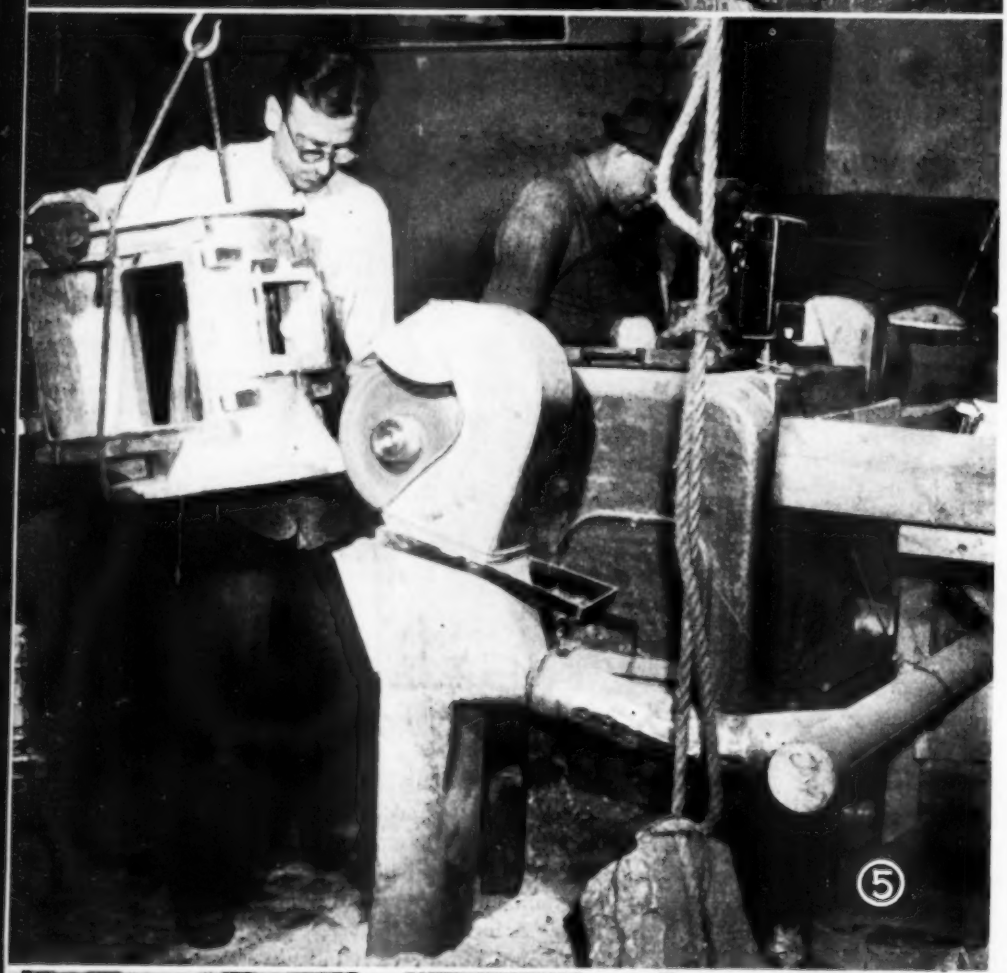
and respect of men engaged in many diversified lines of endeavor. From his impartial viewpoint on the outside, and his intimate knowledge of what was going on in the inside, he was in position to appraise any given business in a more intelligent manner than the actual operators of the business, who—if one may be pardoned for leaning on the well known quotation—could not see the wood for the trees.

One thing led to another, as things have a habit of doing when a skillful leader grasps the steering wheel, and almost before one might ejaculate "Massachusetts Institute of Technology" five times in rapid succession, Mr. Bonner was operating a brass foundry.

The indulgent reader readily will recognize the foregoing ejaculation as a figure of speech. No person ever attempted to say "Massachusetts Institute of Technology" five times in rapid succession. Native sons of the Old Bay State, either by birth or adoption, say "M.I.T." The illustration merely was intended to show that although Mr. Bonner moves fast, he likes to have a good grip with one hand before he releases his former grip with the other hand.

For some time the foundry was operated as a general jobbing nonferrous shop, handling aluminum and the almost limitless varieties of brass and bronze alloys. About a year ago the volume of aluminum castings in process and in prospect became so great that decision was reached to set up another establishment for the production of the light metal castings. A former commercial garage building a short distance from the bronze foundry was secured and converted into a foundry. The new shop rapidly became the dominant unit. A modernly equipped office was established to serve as headquarters and to handle the business affairs of both plants. The workshops are kept as clean and orderly as could reasonably be expected under general jobbing conditions, but the office woodwork and furniture, shining and immaculate, reminds the visitor of the inner sanctum of—say—the First National Bank.

The foundry building, 60 x 200 feet, with concrete walls, level concrete floor, and ample window space in the walls and roof, readily was converted into a shop for the manufacture of castings. Recruiting of a working force adequate to handle maximum production involved a considerable amount of personal effort, but results have been eminently satisfactory. Melting furnaces, molding



machines, core ovens, cleaning equipment and minor accessories were picked up here and there through a wide acquaintance with manufacturers and dealers in foundry equipment and supplies. The nucleus of an operating force was transferred from the bronze foundry, and this force gradually was increased as the equipment became available.

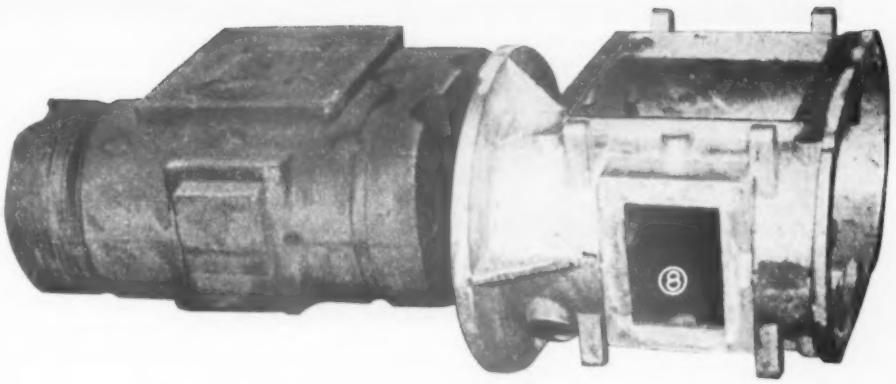
In the present arrangement the melting department at the side and near the end of the foundry is partitioned off by a wall of corrugated steel sheets. Fresh air enters through sectional swinging sash in the side windows. Smoke and heat from the furnaces are exhausted through a row of ventilators in the roof. Metal is melted in a battery of four tilting type crucible furnaces fired with oil. Two furnaces have a capacity of 225 pounds each. Each of the other pair has a capacity of 275 pounds. A large tank buried in the yard outside the building, holds approximately a

◆

Fig. 4—Cope and drag of a large wood flask are reinforced with steel bolts at center and ends. Fig. 5—Emergency rope and counterweight facilitate grinding operation on large aluminum casting. Fig. 6—Aluminum is melted in a battery of four oil-fired, tilting crucible furnaces. Fig. 7—Certain castings with thin metal walls and held to close dimensional shape are made in dry sand core molds. Fig. 8—Dry sand core filled with loose coke collapses readily and does not rupture casting

◆

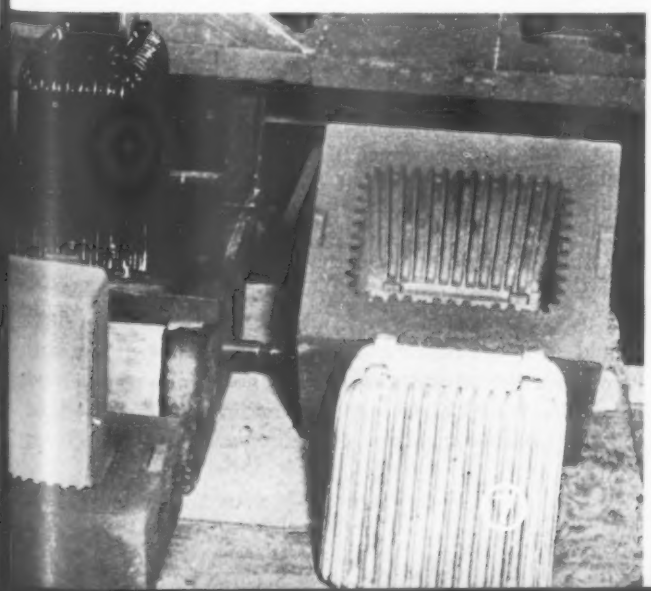
month's supply of oil. Oil from the tank is pumped through a ½-inch diameter pipeline back of the furnaces and at a pressure of 10 pounds per square inch. A 4-inch diameter air pipe and suitable valve connection feeds the air and oil as required into each furnace. Each furnace is covered by a swinging lid attached by suspension bolts to an upright post at the back and operated by a hand lever.



A stock of virgin metal is maintained in the vicinity of the two end furnaces. Sprues and risers from the cleaning room, defective castings and other miscellaneous scrap loaded in suitable containers, are brought into the melting department as required. Every precaution is taken to maintain the floor in a clean and orderly condition for the double purpose of accident prevention, and to facilitate operations.

Molten metal from the furnaces is conveyed in crucibles to the main floor of the foundry where the molds are made. In the ordinary routine a single crucible filled with metal is sufficient to pour either one or a number of molds. Where a mold needs a greater amount of metal, the contents of two crucibles are poured simultaneously into sprues at opposite sides, or opposite ends of the mold. In other instances of course, where the weight is not so great, but where the metal has to run a considerable distance, it is advisable to introduce metal through two sprues and through two sets of gates, to minimize the distance and to prevent cold shuts and missruns.

The coremaking department occupies space at the opposite side of the shop from the melting room. Cores are made on the bench and on the floor, depending on the size, and are dried in a battery of four gas-fired drawer type ovens equipped with thermostatic control and recirculating air system claimed to conserve heat, insure uniform baking condition and promote economy of operation. A corrugated steel sheet hood above the ovens collects heat and smoke and discharges through automatic revolving ventilators in the roof. Base core sand mixture is a fine grain silica sand bonded with oil. Varying amounts of a fine bank sand are added where an increase of green strength is needed in certain shaped cores, or cores that stand high on the plates. Following usual practice, the inside of large bulky cores is filled with coke and old sand.



A core of the latter type is shown in Fig. 8, with the casting alongside. Two other similar castings are shown in Fig. 2, with the cores removed, but with the gates and risers still attached. It may be noted that the large riser extends down to the core print on the outside of the flange. This form of riser involves a little more work in removal from the casting, but it insures a more solid flange than if it were simply placed on top of the flange. The sprue on either side of the casting is reamed out to form a funnel into which the metal may be poured rapidly without danger of sand erosion. The lower end of each sprue terminates in a runner channel at the mold joint and extends to the end flange where the metal enters the mold cavity through a deep, narrow gate. The two gates are at opposite ends and at opposite sides of the casting; that is, diagonally opposite to each other. This arrangement promotes uniform temperature, cooling speed and shrinkage and aids in prevention of draws and cracks.

With the exception of an occasional job presenting unusual features, all the castings are made in green sand molds. A typical exception to the general rule is shown in Fig. 7, a box casting 10 x 14 x 14 inches and ¼-inch thickness of metal, with narrow ribs or fins spaced about 1 inch apart on the sides, ends and top on the outside. This casting must withstand a pressure test and must conform to close dimensional specifications. The mold for this casting is made in a pair of dry sand cores. One, to the left in the illustration, forms the drag. The other, to the right and back of the casting, forms the cope. Projecting rectangular sand bosses on each end of the drag face, and corresponding recesses on the cope face, locate the two parts in proper relation to each other. Metal enters the mold through a small gate in the bottom. The dried sand prevents erosion between the ribs, and the rigid walls hold the casting true to shape and dimension. Drying the mold also is an insurance against blow holes, porosity, segregation and other defects traceable to steam developed from excess moisture in green sand.

Many small castings are made on a battery of molding machines set up close to the wall on one side of the building. These molds are placed on the floor in the vicinity and are poured in batches at frequent intervals. This arrangement minimizes amount of floor space and volume of sand required on each floor. (*Please turn to page* 222)

QUESTIONS and ANSWERS

Tractor Shoe Specifications

Q.—What analysis and heat treatment would you suggest for cast steel tractor shoes in which the specifications call for 100,000 pounds per square inch tensile strength and 15 per cent elongation?

A.—A medium manganese steel usually melted in a basic lined electric furnace and poured into tractor shoe castings conforms to the following analysis: Carbon 0.35 per cent, manganese 1.40 per cent, silicon 0.45 per cent, sulphur and phosphorus not over 0.05 per cent. The castings are heated to a temperature of 930 degrees Cent. (1706 degrees Fahr.) and held for approximately 1 hour, then quenched in water and placed in a second furnace where they are held another hour at a temperature of 600 degrees Cent. (1112 degrees Fahr.) and then gradually cooled to room temperature. The period in the furnaces will vary to some extent depending on the volume of castings in any given batch. The time is based on an allowance of 1 hour per square inch of cross section.

Cast Chains in Core Assembly

Q.—May we have a description of the method employed in casting chains. We have a vague recollection of reading an article on this subject several years ago, but at the time we were not interested particularly and have forgotten the details.

A.—Extensive illustrated articles on the subject were presented in the June 1, 1930 and the Aug. 1934 issues of THE FOUNDRY; also in Chapter XXV of the book *Gates and Risers for Castings*. The following brief reference may serve your present purpose. Chains are cast in sectional core molds. The process involves two principal operations. In the first the required number of single links are cast in the same manner as any other plain simple castings. In one prominent steel foundry the molds with 8 links are stacked five high to produce 40 links. In the second operation the links are placed in molds containing vertical and horizontal cavities. The precast links are placed in the horizontal cavities. Then the liquid steel is poured into the vertical cavities. In this manner the links are united to form a continuous chain of any desired length. For marine service the standard length for a *shot* of chain is 15 fathoms or 90 feet.

For the second operation the core is made in four parts and assembled with a flat vertical core in the center containing the various sprue, gate and riser openings. The gates deliver metal through the risers. Since the link patterns are arranged in the coreboxes on center lines, the cores are symmetrical. Thus one box serves for a right or left core for the cope half, and another box serves to make the two halves, right and left, but somewhat shallower drag core. After the cores are dried they are pasted together in pairs. In assembling the mold the division core containing the sprues, runners and gates is set up. A pair of drag cores is set on each side and the precast links are set in place. The cope cores then are placed on top. The process is repeated for a second or third tier if necessary. After the unit has been assembled, pieces of steel plate are laid up against the two sides and united by tie rods which pass through holes in the cores. When these rods are drawn up tight the cores retain their position without any weights on top. A pouring cup is placed over the central sprue and a small cup over each riser.

Must Resist High Temperature

Q.—We would like information on the most suitable material for a plunger for a push-feed stoker. It does not come in contact with the firebed, but will reach a probable maximum temperature of 1350 degrees Fahr. As it is retracted the plunger is exposed partially to room air, but still is heated by conduction so that the temperature is not reduced to that of the room.

A.—While we believe that an alloy cast iron will give satisfactory results in the plunger, there is one point which can throw considerable light on the subject, and probably govern the decision as to the most suitable material. That is—what is the material used for the construction of the hopper and chute or whatever the plunger operates in; especially that part which is closest to the firebed?

You mention that the plunger will reach a temperature of 1350 degrees Fahr., and we wonder whether that temperature actually has been measured in operation or whether it is someone's guess. Metal at that temperature would be almost a full cherry red in color, and even at 900 degrees the color would be dull red.

Alloy cast irons containing 1.40 to 1.60 per cent nickel and 0.40 to 0.60 per cent chromium are used successfully for grate bars and stoker links. Likewise an alloy iron containing 1 per cent chromium alone has been used for the same purpose, but usually is not machinable. However, if the temperature you mention actually is that at which the plunger operates, we believe that the alloy content will have to be much higher, and perhaps an alloy steel may be preferable to an alloy iron.

Using Dolomite or Limestone

Q.—We have been interested recently in the relative merits of dolomite and calcite limestone for use as a fluxing agent in melting gray iron. Have you any information on these materials?

A.—One well-known metallurgist states that with dolomite as a fluxing agent the actual melting points of the slags are lowered, and they are more fluid. Since cleaning effect of slag on the iron is related to viscosity, the dolomitic slags should give a cleaner iron. However, from a practical viewpoint, the advantages of dolomite over limestone and vice versa are more or less academic in practice. Adjust the slag to contain about 40 per cent silica and 35 per

cent magnesia and lime, and the best results will be obtained in ordinary foundry practice. Amount of stone needed to achieve that result will depend upon the ash, dirt, etc., to be slagged off.

One foundry which employs dolomite as the flux finds a number of advantages which include less slag hole trouble, cleaner tuyeres, little or no bridging, softer iron, and more uniform performance of cupola results. The firm makes light section castings with considerable return sprue, and is using 60 pounds of dolomite and 12 pounds fluorspar to a 1000-pound iron charge. Dolomite is specified to contain approximately 40 per cent magnesium carbonate, and the slag shows 8 to 12 per cent magnesia. Use of fluorspar gives a still more fluid slag than straight dolomite.

Iron Charge Burned in Cupola

Q.—We are forwarding samples of cupola slag and a piece of broken casting and will appreciate your opinion on whether the appearance of the slag gives a clue to what is responsible for the mass of small and large gas holes in the casting.

A.—There is a definite relationship between the appearance of the slag and the porous condition of the casting. The black and shiny slag indicates an oxidizing condition in the cupola, brought about by a high blast, a low bed or possibly a combination of both. The resulting metal is *burned* and impregnated with occluded gas. Some of this gas escapes in the ladle and in the mold while the metal is still molten, but a sufficient amount remains trapped to form sponge-like areas in the casting. The obvious remedy is to investigate and make the necessary changes in the cupola practice.

Contributory causes may be thin steel or rusty scrap in the charge. An almost similar form of defect is found in castings poured from satisfactory iron, but melted on a wet bottom in the cupola, or poured from a wet ladle. However, in the present instance the appearance of the slag points to an oxidizing condition in the cupola. Since you do not mention cupola diameter, weight of coke and iron in the charges or the pressure and volume of blast, we cannot offer any definite figures, but as the first step in your investigation we suggest raising the bed about 6 inches and reducing the blast pressure and volume.

Data on Using a Small Cupola

Q.—We intend to erect a small cupola 12 inches diameter inside the lining to melt ferronickel alloys and will appreciate your opinion on the following points: 1—Is a 12-inch diameter cupola practical? 2—What is the best type of blower and where are they made? 3—Volume and air pressure required? 4—To melt ferronickel alloys we understand the cupola must hold sufficient metal for at least an hour between taps. What will be the height of the tuyeres? 5—What is the best shape for the tuyeres? 6—The only available coke is very high in sulphur and we propose to use charcoal. 7—We want to use a carbon monoxide meter. Who makes these instruments? 8—Do you recommend hot blast? What is the best and most economical arrangement?

A.—Taking the list of questions in order of presentation, the following brief comment may serve your present purpose: 1—A 12-inch diameter cupola is quite practical for melting small quantities of metal. 2—The ordinary fan type blower used extensively for blacksmith fires, rivet heating forges, etc., will supply air for a small cupola. Names and addresses of firms who make these blowers, blast gages and other pieces of equipment referred to in your inquiry, are listed in the advertising pages of THE FOUNDRY. 3—Theoretical melting capacity of a 12-inch cupola is 500 pounds per hour. This will require 7500 cubic feet of air per hour, or 125 cubic feet per minute at a pressure of 4 or 5 ounces per square inch, although these figures may vary to some degree.

4—In a 12-inch diameter cupola 500 pounds of metal—result of an hour's melting and allowing for the coke bed—would extend upward 33 inches. Hence the tuyeres would have to be at least that distance above the bottom. We do not think the idea is feasible. Also we can see no necessity for holding the metal in the cupola for an hour. A reasonable height for the tuyeres is 10 inches above the bottom. The metal can be tapped at 15 minute intervals into a highly heated ladle covered with charcoal.

5—Shape of the tuyeres is immaterial. Probably the best arrangement would be three 2-inch diameter tuyeres spaced equidistantly. 6—Charcoal has been used as cupola fuel. Volume required is about twice that of coke. 7 and 8—Since preheated air or hot blast is derived from the operation of the cupola, it is not practically applicable to short heats.

Alloy Copper with Beryllium

Q.—We are interested in receiving information you may have on sand-cast copper-base alloys with beryllium or other addition agent which will show a tensile strength above 150,000 pounds per square inch, a yield strength above 80,000 pounds per square inch (0.5 per cent elongation), a rockwell hardness of 30C or better, and corrosion resistance as good as 70-30 brass. The only reference we could find to sand-cast beryllium-copper was a 4 to 11 per cent beryllium alloy, and limited information.

A.—Not a great deal has been published on beryllium-copper alloys, perhaps due to the fact that most of the combinations or their heat treatment are proprietary processes. Some interesting information on casting, heat treating and properties of beryllium-copper are presented in an article by E. F. Cone in *Transactions* of the A.F.A., Vol. 41, 1933.

Highest strength according to Cone is attained with an alloy containing about 2.5 per cent beryllium which is heat treated at 1475 to 1500 degrees Fahr. quenched in cold water and reheated to 575 degrees. The alloy after heat treatment shows a tensile strength of 110,000 to 120,000 pounds per square inch; yield point of 85,000 to 90,000 pounds per square inch, and a brinell hardness of 375 to 400.

Much higher figures for physical properties can be obtained by cold-working, such as rolling and forging. Also, the addition of a third or fourth element to beryllium-copper, such as nickel, chromium, cobalt, iron, etc., permits considerable increase in physical properties. In general, beryllium-copper alloys are made from a master alloy containing 12.5 per cent beryllium. For more definite information on beryllium-copper alloys, we suggest that you get in touch with producers of the master alloy who will be glad to supply practice data.

Coin New Name For An Old Process

Q.—Recently we have seen reference to a new investment molding process, and will appreciate receiving any information on the subject.

A.—The term investment molding is just a fancy name for the cire perdue or "lost wax" process of making castings, and was borrowed from the dental profession which like the medical follows Latin terminology in describing its works. Originally the word invest meant to clothe, and later usage includes to envelop, surround or put on, and the word investment applies to the material with which the object is invested.

In dentistry inlays and other metallic structures are made from wax impressions which are surrounded or invested with some refractory material. The wax is melted out, and the remaining cavity is filled with molten gold or other alloy. The metallic structures used in the dentistry must be cast accurately to size, especially inlays which must fit the tooth cavity exactly to prevent ingress of mouth acids, etc. Hence the molding material or investment must be one which practically has no shrinkage or expansion, and many of those are available as proprietary materials.

With the war demand for castings which could be used without machining, especially those made from high melting point alloys for elevated temperature applications such as in turbo-superchargers for airplane engines, some dental firms became interested since they had developed alloys which were applicable as well as the procedure for producing such accurate castings. As a result those firms followed the terminology with which they were familiar, and called the method "investment molding."

May Arrange Cupolas In Several Ways

Q.—We are considering the rearrangement of a foundry which will require six cupolas set up in a group to permit single or group operation. We would require mechanical charging and distribution of molten iron. Without considering any limitations to building or yard, we would like to have your opinion of an ideal layout for the arrangement and location of the cupolas with the location and method of handling the usual materials necessary for gray iron cupola operation. We are not interested at this time in the type or manufacture of mechanical equipment except where it might govern the layout necessary for general arrangement.

A.——Arrangement of cupolas in the foundry is dependent upon a number of factors as you readily can realize, but in general we believe that the primary requisite is to place them so that the molten iron has to be carried the shortest distance so that the temperature drop is at the minimum. An ideal system we believe, would be to locate the cupolas in a line along an outside wall of the foundry adjacent to a stockyard under cover, and to have all the molds conveyed to a pouring station extending in front of the cupolas.

However, with today's mechanical charging systems it is not necessary that the cupolas be close to the stockyard. We understand that there is one installation where the cupola raw materials are elevated at the stockyard and carried a considerable distance in charge buckets over the roofs of intervening buildings into the cupola. In another installation a tunnel with a larry car to transport the buckets connects the stockyard with the cupolas.

Location of the cupolas may depend in some degree upon the layout of the foundry, and it is quite possible that you might desire to arrange the cupolas into three groups of two each; each group to be located close to a particular section, especially if the foundry is divided to produce castings of three different classifications. Likewise the

stockyard would be divided into three sections, each with its own particular type of raw materials. However, with high speed telphers to carry the molten metal, and insulated ladles, molten iron can be transported a considerable distance, and still be sufficiently hot to pour even the lightest castings.

In the stockyard we believe that present tendency is to have it roofed over to protect both workers and materials from the weather. Also various raw materials are stocked in bins, and such materials as coke and limestone are stored in elevated hoppers so that those materials can be placed in charging containers by gravity. Stockyard is spanned with sufficient cranes for unloading ferrous materials from gondola cars with a magnet, and loading those materials into charging containers located under funnels or hoppers, and on scales. Dials for the scales are situated so that the crane operator can plainly see the indicated weight. Since molding and core sands also may be kept in the same stockyard, a bucket can be substituted for the magnet for crane-unloading open-top cars.

In some of the newer foundries the cupolas are walled off from the foundry proper so that the heat and smoke are confined to that one section which, of course, is ventilated to insure comfortable working conditions. In fact, with such an arrangement ventilation is easier since the area is smaller. Another method to confine the heat and smoke of the cupolas would be to construct an air curtain arrangement with suitable duct-work, adjustable louvers, and a blower system. In fact, in a production shop using conveyors or tramrails for mold movement, the actual molding department could be separated from the pouring stations by a wall with suitable openings, or an air curtain.

We believe it might be worthwhile to get in touch with various producers of mold and materials handling equipment, cupola charging equipment, etc. —describing what you want to do, and they may have made installations that can be adapted to suit your needs.

Install Equipment For Soil Pipe

Q.—We are contemplating the manufacture of soil pipe castings in straight lengths and fittings. We are not familiar with the method of producing this class of castings and will appreciate any advice you can give us on the subject.

A.—The manufacture of soil pipe castings is a highly specialized branch of the casting industry. The entire demand for the country is supplied by a comparatively small number of manufacturers. The initial expense of installing the necessary equipment is considerable and we doubt if the local demand will amount to enough to offset this first cost. Extended descriptions of the equipment and methods employed in the manufacture of soil pipe castings have been presented in THE FOUNDRY on many occasions. The following brief description may serve your purpose:

The smaller sizes of straight pipe up to and including 5 inches diameter are molded two in a flask and poured through four sprues connected to shallow gates in the drag joint. The gates form part of the pattern equipment and are detachable. A number of drags are rammed first. Then the gate patterns are removed and the copes are rammed on the same pattern setup. Formerly four hand ladles were employed to pour iron into the molds. Present day practice favors a long ladle provided with four spouts in line and spaced to correspond with the four sprues equally spaced along a straight line in the center of the cope.

Cast iron flasks are designed to hold a minimum amount of sand. The sides slant away from the joint. Cope and drag are equipped with one or two cross bars and no bottom plates are needed. Molds are rammed on an iron pattern plate mounted on four wheels. Two whole patterns which have been turned true in the lathe and polished, are mounted in such a manner that the upper surface of the stripping plate coincides with a longitudinal center line on the pipe pattern. A toggle and lever combination drops the patterns approximately 1 inch before the cope or drag is lifted. A reverse pull on the lever raises the patterns again into ramming position.

Cores for the straight pipes are formed

(*Concluded on page* 98)

ON THE MARCH
to aid Foundrymen...

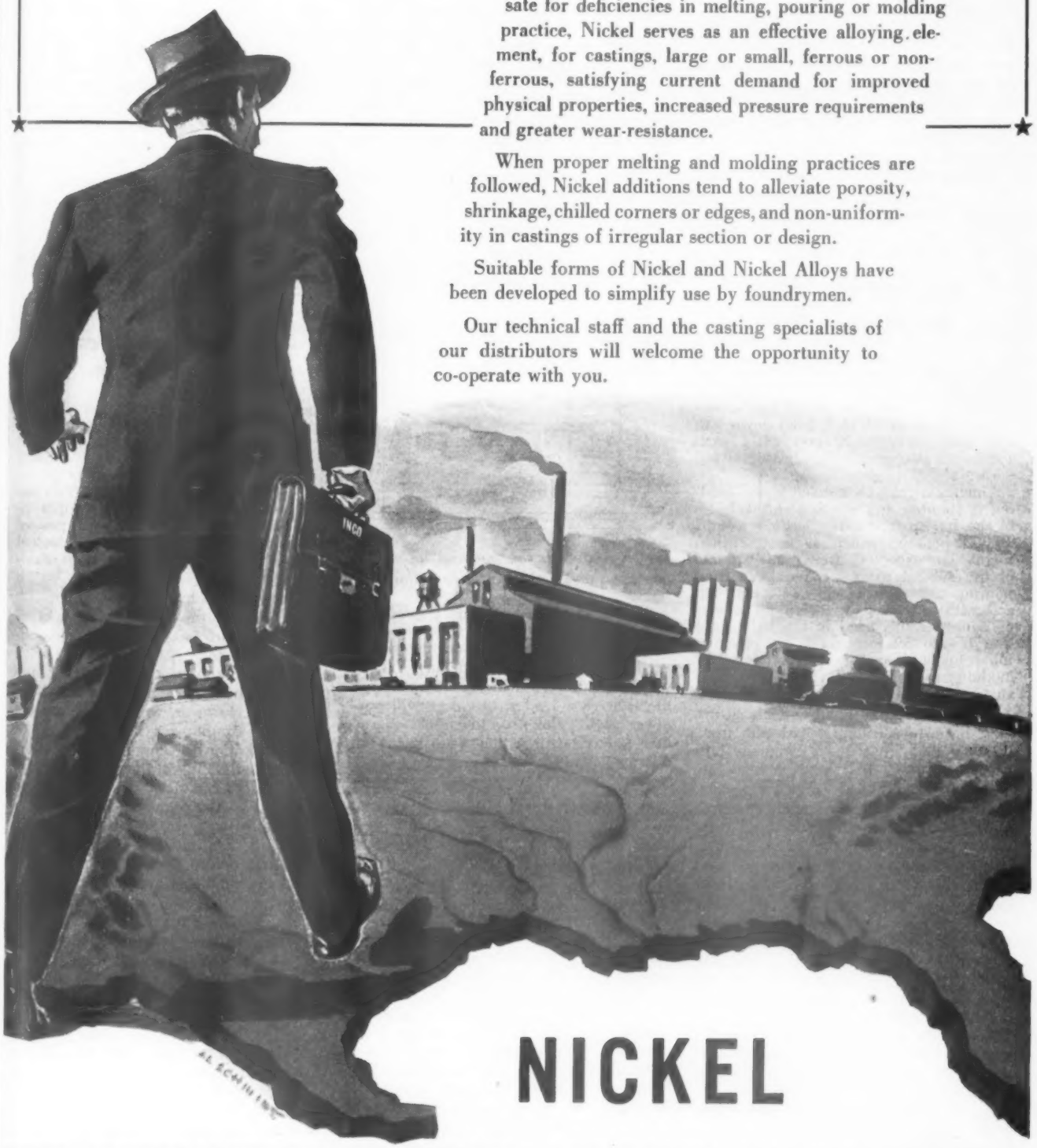
NICKEL FIELD REPRESENTATIVES are always "on the go." By reason of training and experience they are equipped to offer timely assistance on foundry problems.

While not a "cure-all" in that it will not compensate for deficiencies in melting, pouring or molding practice, Nickel serves as an effective alloying element, for castings, large or small, ferrous or non-ferrous, satisfying current demand for improved physical properties, increased pressure requirements and greater wear-resistance.

When proper melting and molding practices are followed, Nickel additions tend to alleviate porosity, shrinkage, chilled corners or edges, and non-uniformity in castings of irregular section or design.

Suitable forms of Nickel and Nickel Alloys have been developed to simplify use by foundrymen.

Our technical staff and the casting specialists of our distributors will welcome the opportunity to co-operate with you.



NICKEL

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK, N. Y.

(*Concluded from page 96*)

by allowing a thin stream of green sand to fall on a barrel, revolved either by hand or in a modified form of lathe, started and stopped by a treadle. A long strike arranged in a suitable manner regulates the thickness of sand. Patterns for the special fittings, particularly in the larger sizes are exact duplicates, plus contraction allowance of the castings to be made. The pattern is split along a horizontal center line and both mold and core are made at the same time. In the smaller sizes split patterns provided with core prints are mounted on plates attached to a plain squeezer machine. The green sand cores are made in hinged coreboxes. The greatest care and accuracy are required in fitting up the flasks, patterns, coreboxes and arbors. A suitable grade of sand, fairly close, but permeable must be employed in making the cores. The floor is prepared in a special manner by laying two rails, or in some instances, two concrete foundations about 5 feet apart, perfectly level and parallel on which to lay down the molds.

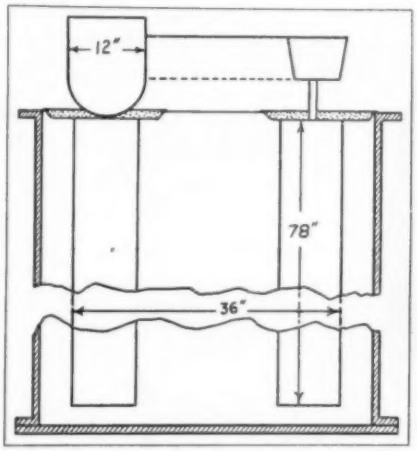
Cut Off the Riser On Hollow Roll

Q.—Our practice in making a sugar mill roll 36 inches outside diameter, 17 inches inside diameter and 78 inches in length, is to pour the metal into a circular basin from which it flows down into the mold through 10 pop gates each 1½ inches diameter. The casting is fed with a rod through a riser 8 x 9 inches, 22 inches high. Occasionally the feeding is slighted and we find shrink holes in the top surface. The casting weighs 16,300 pounds, which is greater than might be expected from an estimate of the cubical content. We have tried pouring these rolls with an open top and with a 16-inch extension. The cost of removing this head in the lathe, cutting it into 5½-inch disks for breaking into cupola charging size, renders the method prohibitive. We shall appreciate an available solution for this problem.

A.—Presumably the mold is made in dry sand inside a substantial cast iron flask, but the fact that the casting weighs considerably more than the estimate based on the cubical content, suggests the possibility that the mold yields to some extent under the high static pressure. Normal shrinkage of a uniform cross section casting is downward and self feeding. This is illustrated in ingot molds, paper dryer shell rolls and others of a somewhat similar character which require no feeding risers. However, if the mold yields after it is filled, the metal sinks at an accelerated rate and some of the metal is drawn away from the frozen layer on the top.

You might measure the diameter of the lower end of the roll with a pair of calipers and note if this condition exists. If necessary, proper precaution can be taken to produce a stronger and firmer mold. In the event that this is not the case and that feeding is required at the top to eliminate the hand pumping and subsequent breaking of the riser metal to cupola charging size, the method shown in the accompanying sketch probably will serve your purpose. The top of the mold is covered with a number of flat cores. Each core has a pop gate opening 1½ inches in diameter, and one core has a 3-inch opening and a dish 12 inches in diameter. A gate pin is placed in each small opening in the usual manner and a 12-inch diameter riser pattern is erected in the dish. Then the runner basin is built up.

By watching down the riser the stream of metal from the ladle can be cut before the metal appears in the riser. The remaining metal in the basin will drain down and empty the basin. The pop gates will freeze quickly. Then the riser is filled with fresh, hot metal and the top is covered with charcoal, blacking, silocel, or dried sand. Since a 12-inch diameter riser 12 inches high will weigh approximately 325 pounds, it may be split in two or even into four sections by inserting one or two thin, flat cores vertically in the riser opening. They will not interfere with the function of the riser as a feeder, but they will permit reducing the riser to cupola charge and size after it is knocked from the casting.



Sketch showing the method of using pop gates and a riser on large hollow roll

Base Sand Selection On Several Factors

Q.—What advantage has synthetic over natural molding sand? How does the cost of handling and preparing synthetic sand compare with the cost charged against the use of natural sand?

A.—So many variables enter into any discussion of the sand question that it is impossible to state dogmatically that one type of sand is superior to another. Amount of sand handled, character of the castings, cost of new sand in any given locality, available equipment and personnel, and many other factors must be taken into consideration. In certain branches of the foundry industry, for example the steel foundry and the core department, synthetic sand practically is obligatory. With the exception of a deposit of naturally bonded sand in one of the eastern states, all the sand used in steel foundries in this country is synthetic, an artificial compound of clear silica sand bonded with clay and other types of artificial binder.

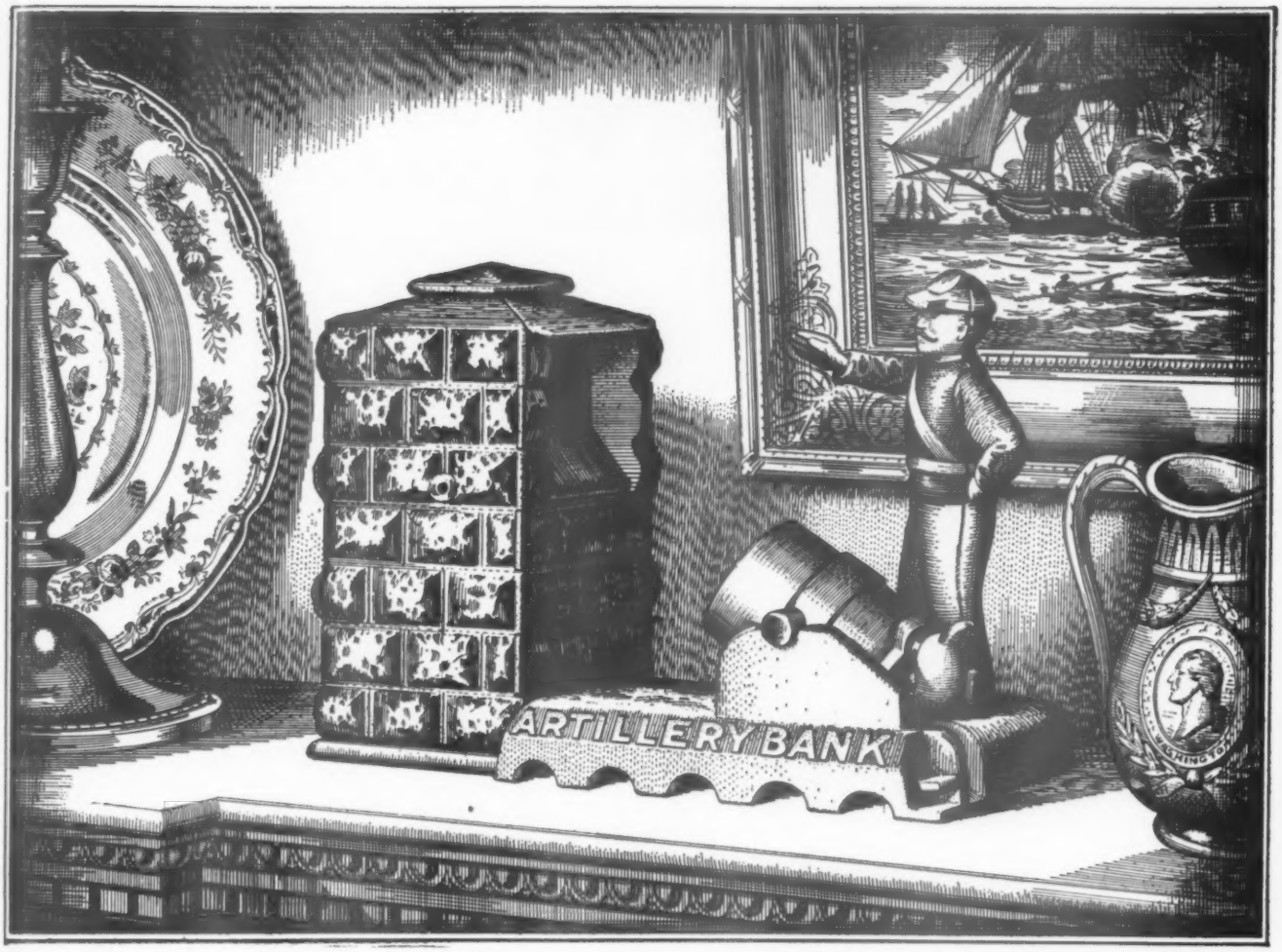
Core sand in ferrous and nonferrous foundries is a synthetic product. One of the reasons for using synthetic sand in gray iron foundries is that it gives the foundryman an opportunity of re-using spent sand that otherwise would be discarded and hauled away to the dump. This is not such an important item where sand is cheap and plentiful, but it looms rather large on the cost sheet where freight and other items run the cost of new sand up to $10 or more per ton. Where personnel and equipment are available, synthetic sand permits foundryman to exercise accurate control over the various physical properties, grain size, permeability, bond, moisture content, green and dry strength. Result of this control is reflected in the quality and surface appearance of the castings. While no comparative cost figures are available for publication, a certain amount of significance attaches to the fact that practically all leading foundries have installed sand control systems.

Bronze Blank Gears Show Specks

Q.—We are sending you four small blank gears about 2½ inches in diameter and ½-inch thick which show numerous small specks on the cope side. Castings are fussy, and must be free from porosity. Material is bronze and we mix our own metal which is 85 refined copper ingots, tin, zinc and lead. Alloy is poured at 1950 degrees Fahr. At the present time 40 per cent of our castings show the specks.

A.—Presumably by the specks you are referring to the numerous pockmarks on all castings, and to the folds on one. Unfortunately, the castings have been cleaned thoroughly so that all of the material which formed the pits has been removed. However, we strongly suspect that your trouble results from lack of proper attention to skimming, particularly around the lip of the crucible, permitting dross and slag to be carried into the cavity. Also some of the pits may result from loose sand particles lying in the cavities or runner which are not blown out before closing the mold.

You do not mention whether you are employing a cover or flux on the metal during melting, but presumably you are. It may be that the resulting slag formed may be too thin and liquid for easy removal during skimming, and it is suggested that you thicken it by addition of a little sand just before that operation. Also you did not state the arrangement of patterns, but we assume that you are using a central runner with branches leading to several cavities on each side. It may be worth your while to extend the central runner an inch or so beyond the last pair of patterns to act as a blind pocket to catch any dirt or dross which is carried along with the first rush of metal into the mold.



Historic coin bank from an old New England collection

BANK OF OUR FOREFATHERS

The early colonial was a stickler for thrift! Saving was made a game and banks like the one pictured here were a conspicuous part of every household. Ingeniously constructed they were, too, for they were made so that once the money was inside you could not take it out unless you broke the bank . . . and woe betide the one committing such a sin.

Thrift is playing its same important role in today's war and the pennies, dimes, and dollars of true Americans are shaping and powering mighty dreadnoughts, miracle Fortresses of the air and an endless stream of other Victory-making war material. Our country is dotted with hard-hitting production plants . . . monuments to the savings of each of us who, day after day, is helping to make America a better, a happier, and a safer place in which to live . . . savings that finance the war . . . with War Bonds.

War Bonds keep our Boys on the march . . . to Victory. Save for them. Start a family War Bond game in your home. Pool your pennies, nickels, dimes and dollars just as our forefathers did back in Revolutionary days. Set aside a specified time each week or month to turn this saved-up money into fighting War Bonds. Then, when the rainbow of Peace beautifies America's horizon, those dream things of tomorrow can be yours . . . they can be paid for with the War Bonds you buy today.

A War Bond Message Designed and Contributed by Buell Engineering Company, Inc., New York

buell
DUST RECOVERY SYSTEMS

MEN ... of Industry

LEON B. THOMAS, for the past 9 years chief metallurgist, melting superintendent and assistant to the general manager of all five plants of Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich., has been appointed foundry manager for the Wilson Foundry & Machine Co., Pontiac, Mich., effective Sept. 16. Prior to his association with C-W-C, he was for 5 years assistant technical superintendent of the Ohio Brass Co., Mansfield, O., and before that served with Westinghouse Air Brake Co., Wilmerding, Pa., as assistant chief chemist and metallurgist; and with the Sheffield plant of Fairbanks, Morse & Co., Three Rivers, Mich., as chief chemist and metallurgist, later foundry superintendent. He is a member of leading technical societies in the metals field, and in recent years has been closely associated with the development of centrifugal castings, cast camshafts and crankshafts, and the triplex melting of steel for castings.

♦ ♦ ♦

Steven van R. Spitler, until recently chief of the Castings and Fabricated Products Section, Iron and Steel Branch, Office of Price Administration, has been appointed assistant to the president of Ross-Meehan Foundries, Chattanooga, Tenn. Mr. Spitler was graduated from Georgia Institute of Technology and also attended Ohio Northern University. Before joining the OPA he was president of the engineering firm W. F. Jackson Co. Inc.

♦ ♦ ♦

R. W. Mattison, recently elected chairman of the Northern Illinois-Southern Wisconsin Chapter of the American Foundrymen's Association, is vice president of Mattison Machine Works, Rockford, Ill. He became associated with the company in 1935, and was made vice president in 1939. Mr. Mattison has been a member of the Northern Illinois-Southern Wisconsin Chapter for 6 years. He served as secretary-treasurer in 1940-1942 and was elected vice chairman in 1943.

♦ ♦ ♦

W. D. Bailey Jr., recently elected president of the Southern California Chapter of the American Foundrymen's Association, is sales manager of Westlectric Castings Inc., East Los Angeles. Mr. Bailey studied at Central College, Fayette, Mo., Missouri University, and at the University of Southern California. For 6 years he was associated with Pacific Metals Co., Los Angeles, joining Westlectric Castings Inc. in 1941.

♦ ♦ ♦

Henry C. Schuld, recently appointed assistant superintendent, Sweets Foundry, Johnson City, N. Y., served his apprenticeship at the Elmira Foundry Co. Inc., Elmira, N. Y. For 23 years he was associated with Chemung Foundry Corp. in that city, serving successively as coreroom foreman, assistant foundry foreman, foundry foreman, and assistant superintendent.

♦ ♦ ♦

O. C. Tabbert has been appointed assistant manager of the P&H Welding Equipment Division, Harnischfeger Corp., Milwaukee. Mr. Tabbert received his practical training in the company's welding shops, later becoming a field representative in the upper Michigan and Wisconsin territories. He was recently welding engineer in the Milwaukee sales district, and during the past year he also served a period as acting manager of the Harnischfeger district office in Jacksonville, Fla.

♦ ♦ ♦

Irving Schwartz, for over 20 years associated with Scully Machinery & Equipment Corp., and its predecessor, the Foundry Division of Scully-Jones & Co., Chicago, recently severed this connection and is forming his own organization to handle used or reconditioned foundry and industrial equipment. Temporary office has been established at 1537 Utilities Building, 327 South LaSalle Street, Chicago.

♦ ♦ ♦

A. J. Hanlon, recently retired manager of the production department, the International Nickel Co., New York, has been appointed production manager, the Harvill Corp., Los Angeles, where he will supervise developments for postwar production when the needs of wartime aviation have been filled. Mr. Hanlon was graduated from Villa Nova College and has had over 25 years experience in the production of metals and metal products.

♦ ♦ ♦

Fred L. Curtis has been appointed manager of the sales engineering department, Norton Co., Worcester, Mass., with headquarters in that city. He has been associated with the company for 16 years as abrasive engineer, for the past 5 years in Detroit. **Fred W. Grant,** with the company more than 30 years, has been appointed merchandising engineer,

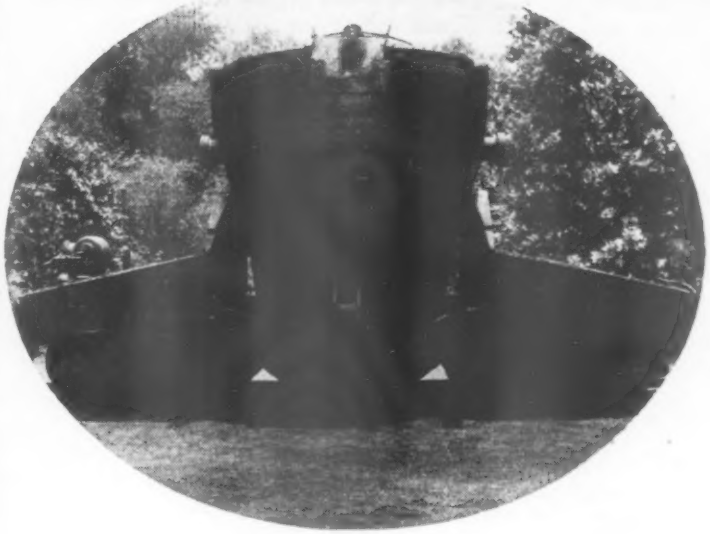
(*Continued on page* 102)

LEON B. THOMAS

STEVEN van R. SPITLER

R. W. MATTISON

W. D. BAILEY JR.



TOP—*These three ladles hold an entire cast from a furnace.*

BOTTOM—*This ladle is especially designed for complete, uniform mixing of one full carload of pig iron.*

Each Ladle Fills One Car

By using ladles that fill a single car with pig iron, Woodward provides additional insurance against variation in analysis.

This is one of many coordinated production practices combining to maintain the consistent uniformity in chemical and physical properties for which Woodward iron is nationally famous.

WOODWARD IRON COMPANY

WOODWARD, ALABAMA

Independent Since 1883

GENERAL SALES OFFICES

1515 FIRST NATIONAL BUILDING • BIRMINGHAM, ALABAMA • PHONE 4-6786

R. J. DAVIS

R. J. HEINZ

JOHN SOLOMON

J. M. POKLEMBA

(*Continued from page* 100)

in the Worcester office. **Paul H. Carlson** succeeds Mr. Grant as abrasive engineer in the Milwaukee territory, and **E. C. Willey** will take over Mr. Carlson's Moline, Ill., area as abrasive engineer.

♦ ♦ ♦

R. J. Davis, recently assistant manager of the Union Steel Castings Division, Blaw-Knox Co., Pittsburgh, has been appointed plant manager. Mr. Davis has been associated with the company since 1938. He has been succeeded by **John Solomon,** who previously had been general superintendent and who had been connected with the division since 1915. **R. J. Heinz,** who joined Union Steel Castings in 1934, has been promoted to general superintendent. Formerly he had been superintendent of the finishing department. **J. M. Poklemba,** associated with the division since 1935 and formerly assistant production manager, has been appointed superintendent.

♦ ♦ ♦

M. M. Clark has been appointed metallurgical engineer in the Ohio district of the Climax Molybdenum Co., New York, and will have his headquarters in Canton. Mr. Clark's previous connections include United Alloy Steel Corp., Central Alloy Steel Corp., and Carnegie-Illinois Steel Corp.

♦ ♦ ♦

John L. Jones, formerly associated with the foundry division of Pontiac Motor Co., Pontiac, Mich., and more recently connected with the Great Lakes Foundry Sand Co., Detroit, has joined the National Foundry Sand Co., Detroit, as sales engineer. Mr. Jones was at one time manager of Lansing Co., Lansing, Mich., and later connected with Jahns Cylinder Grinding & Foundry Co., Los Angeles.

♦ ♦ ♦

Ralph W. Hisey, since 1935 vice president of the Osborn Mfg. Co., Cleveland, has been appointed vice president in charge of all manufacturing and engineering of the brush and machine divisions of the company. **Hugh M. Little,** who has been made works manager of both divisions, was formerly associated with the Ohio Crankshaft Co., Cleveland, and the American Bantam Car Co., Butler, Pa.

L. F. Weyand, associated with Minnesota Mining & Mfg. Co., St. Paul, for 28 years, has been appointed general manager in charge of production, sales, research and laboratory activities of the adhesive and coatings division of the company in Detroit. Mr. Weyand has been general sales manager of that division in Detroit since 1936.

♦ ♦ ♦

George M. Leitch, shipping clerk for American Foundry & Furnace Co., Bloomington, Ill., began his fiftieth year of employment with the company recently. **Elmer Reynolds,** foreman in the shipping department, has been with the company 45 years.

♦ ♦ ♦

John L. Blair, Dedman Foundry & Machine Co., Houston, Tex., has been appointed a director of the Texas Chapter of the American Foundrymen's Association to succeed the late H. F. Elmer of the same company.

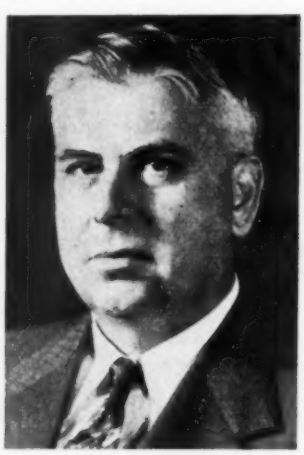
♦ ♦ ♦

Paul Torre, newly appointed sales engineer in the New England territory for the Foxboro Co., Foxboro, Mass., will

(*Continued on page* 104)

M. M. CLARK

JOHN L. JONES

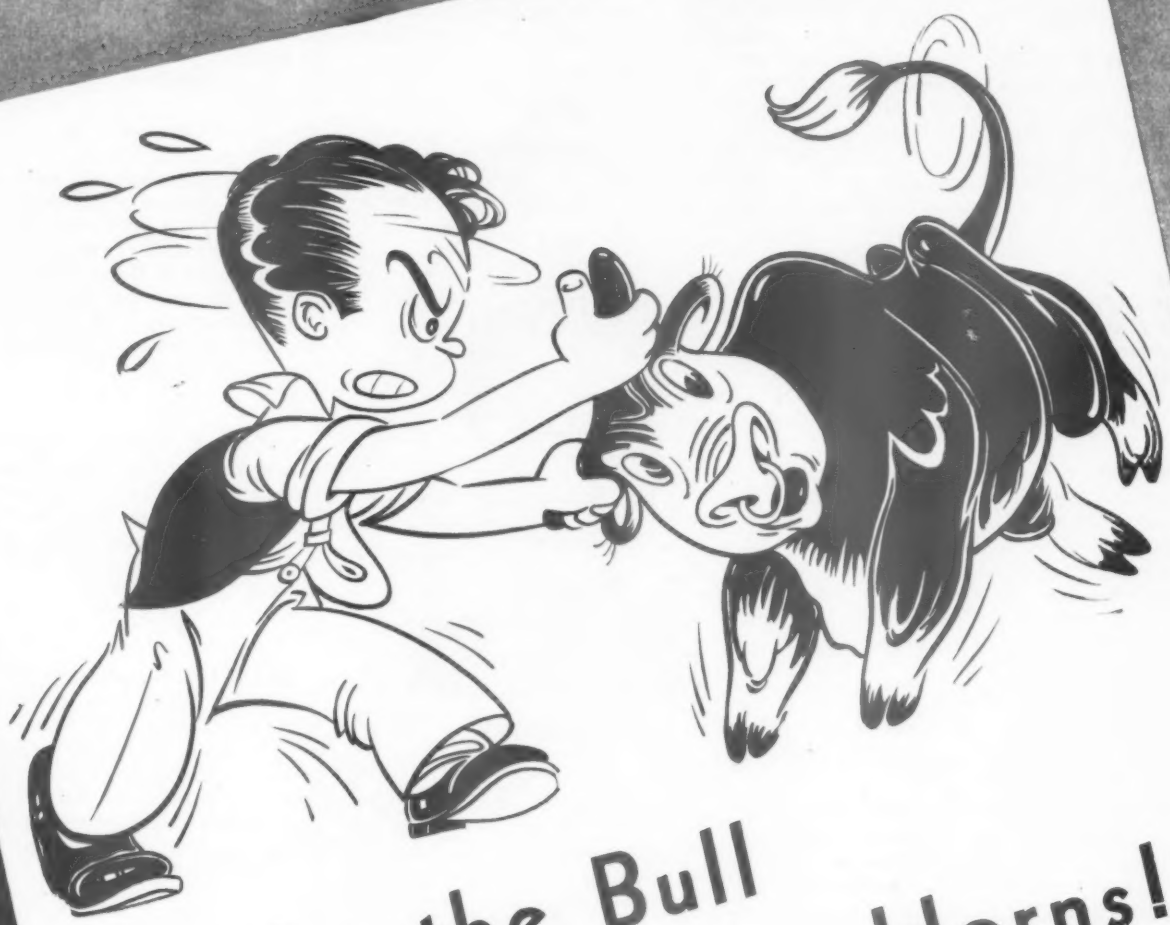


RALPH W. HISEY

HUGH M. LITTLE

THE LAST DROP IS AS GOOD AS THE FIRST

Ask the Men Who Use It!



Take the Bull By the Horns!

When you buy Core Oils you want one thing . . . UNIFORM, unvarying GOOD RESULTS. If you're not getting these results perhaps Dayton Oils can furnish the answer. Now is the time to "take the bull by the horns" and give DAYTON Oil a trial. We guarantee your complete satisfaction.

The

DAYTON OIL COMPANY

DAYTON • OHIO

STEEL CORE AND MOLD WASHES • BINDER AND CORE PASTE • CORE WASHES • CHILL COATINGS

(*Continued from page* 102)
have his headquarters in that city. Mr. Torre has been engaged in technology and production control for almost 25 years.

♦ ♦ ♦

Charles B. Saunders, formerly assistant sales manager, Lone Star Steel Co., Dallas, Tex., has joined the sales department of Woodward Iron Co., Birmingham, Ala. For several years Mr. Saunders was associated with Tennessee Coal, Iron & Railroad Co. as foundry metallurgist and did sales and service work in pig iron in the southeastern and midwestern states. He is a member of the Texas Area Chapter of the American Foundrymen's Association, and formerly served as chairman and director of the Birmingham District Chapter.

♦ ♦ ♦

E. L. Beisel has been elected vice president and general manager of Western Metal Abrasives Co., Chicago Heights, Ill., in charge of its new abrasive plant recently put in production there. Mr. Beisel has been in the metal abrasive field for many years, having been associated with Parsons Engineering Corp., and Steel Blast Abrasives Co., of Cleveland, and Industrial Metal Abrasives Co., Jackson, Mich.

♦ ♦ ♦

Joseph S. Bennett has been elected vice president of the American Engineering Co., Philadelphia. Entering the company as a draftsman, he successively became assistant construction engineer, assistant mechanical engineer, and manager of sales. Mr. Bennett was graduated from the University of Pennsylvania, where he is a special lecturer at the graduate school.

♦ ♦ ♦

Leo F. Dalton became associated on Aug. 1 with Great Lakes Foundry Sand Co., Detroit, as metallurgist and sales engineer. Mr. Dalton has an extensive background in metallurgical work, having served as metallurgist for West Steel Castings Co., Cleveland, and the Atlantic Foundry Co., Akron, later affiliating with Lectromelt Steel Casting Co., Barberton, O., and Barberton Foundry Co. In 1940 he joined Symington-Gould Corp., Rochester, N. Y., and for the past 2 years has served as chief metallurgist for that company.

♦ ♦ ♦

Roy W. Bennett, formerly foundry sand technician, Harry W. Dietert Co., Detroit, has been appointed foundry engineer of E. F. Houghton & Co., Chicago. Mr. Bennett was at one time connected with American Steel Foundries, Indiana Harbor, Ind.

ROY W. BENNETT

♦ ♦ ♦

Lyman C. Thunfors, recently appointed vice president and general manager of manufacture and production, Richmond Radiator Co., Uniontown, Pa., was formerly associated with the Caterpillar Tractor Co., Peoria, Ill., as assistant factory manager before becoming assistant factory manager of Richmond Radiator in January this year. He attended school in Muskegon, Mich., later serving an apprenticeship in the Howe Chain and Lakey foundries of that city.

Frederick K. Lovejoy, has been appointed manager of the Kansas City district sales territory of American Machine & Metals Inc., East Moline, Ill. Mr. Lovejoy was associated with Consolidated Laundries Corp., New York for 14 years, and prior to that was with Indiana Flooring Co., and later with York Safe & Lock Co. He is a graduate engineer of Cornell University.

♦ ♦ ♦

R. E. Bressler, formerly vice president and chief engineer, Kol-Master Corp., Oregon, Ill., has been elected president and treasurer of the company, to succeed the late Joseph F. Reed. **Henry G. Wickham** becomes vice president, and **Joseph C. Reed,** secretary. All three have been elected to the board of directors.

♦ ♦ ♦

Littleton C. Barkley, formerly manager of the New York office of Manhattan Rubber Mfg. Division, Raybestos-Manhattan Inc., Passaic, N. J., has been appointed sales manager of the Manhattan mechanical rubber goods sales department of the company.

♦ ♦ ♦

Frederick C. Knowles, who has recently become boron carbide engineer for Norton Co., Worcester, Mass., will cover the Cleveland, Detroit, and Chicago territories, with headquarters at the warehouse in Detroit. Mr. Knowles will devote considerable time to application of gages, a field in which he has had long practical experience.

♦ ♦ ♦

John A. Atkins has been appointed service engineer for Ordnance Steel Foundry Co., Bettendorf, Iowa. He formerly was superintendent of the cleaning and finishing department of General Steel Castings Corp.

♦ ♦ ♦

Albert H. Charlton, sales manager for the Philadelphia area of Reynolds Metals Co., Richmond, Va., since 1942, has

(*Concluded on page* 108)

C. B. SAUNDERS

E. L. BEISEL

JOSEPH S. BENNETT

LEO F. DALTON

Cordip, an exclusive product of the United States Graphite Company, is simplifying dipping and improving cores and castings in many busy foundries. In powdered form and containing its own binder, Cordip is easily mixed with water to 35° Baume' for dipping and to 25° Baume' for spraying.

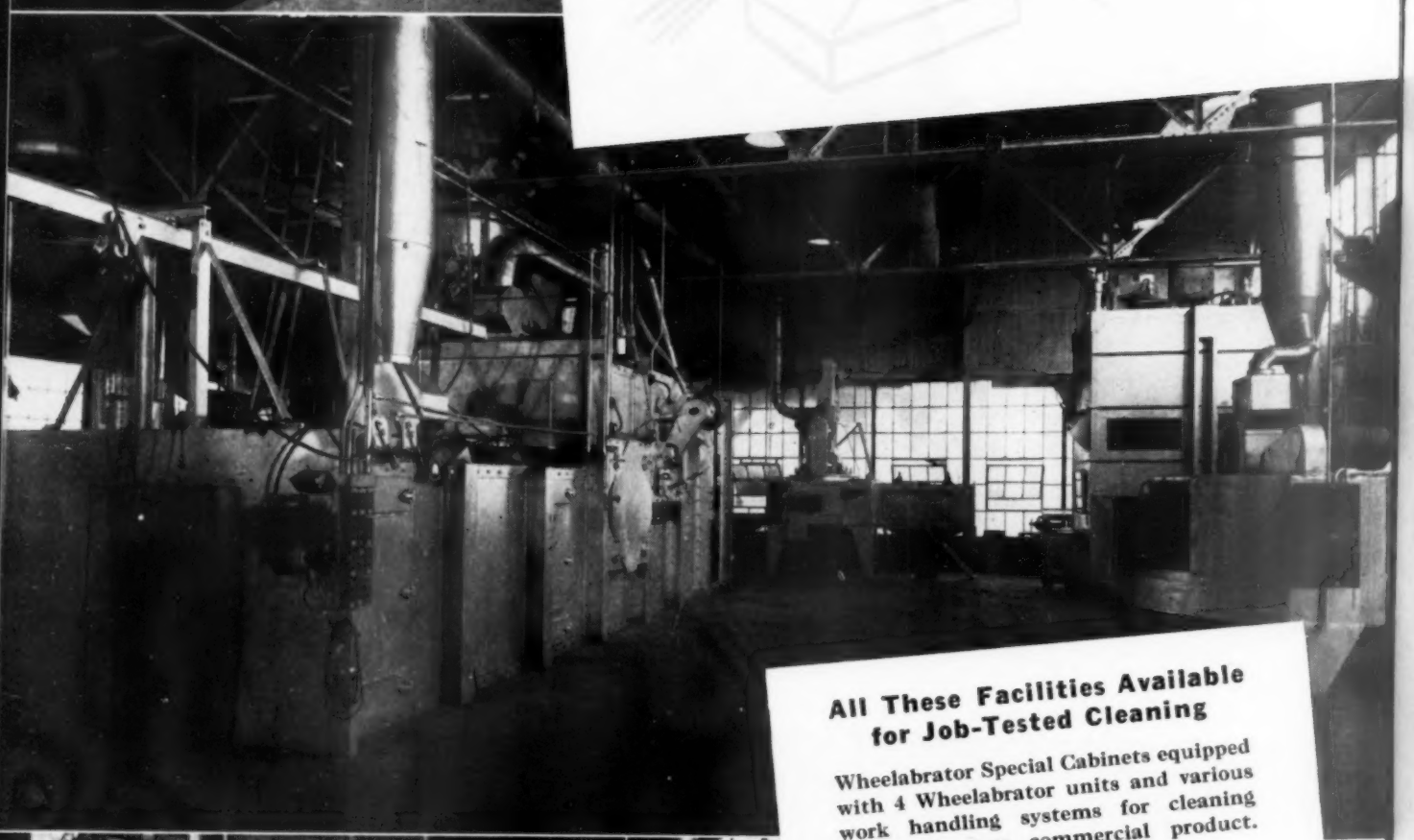
Cordip is equally efficient for dry or green sand cores. It distributes itself evenly, does not build up on shoulders or seal vents or leave ruffled uneven surfaces. Fast drying Cordip does not rub off when handled and holds true core dimensions.

By eliminating penetration, Cordip insures castings freer of sand and thus reduces cleaning time.

It will pay you to use Cordip to improve the quality of your castings and increase production in your foundry. There is a grade of Cordip to exactly meet your requirements. For further data write to:

THE UNITED STATES GRAPHITE COMPANY • SAGINAW, MICHIGAN

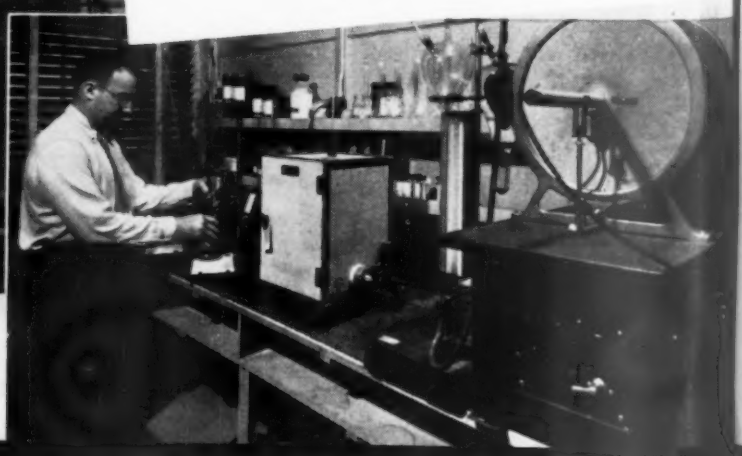
YOURP
FOR B



All These Facilities Available for Job-Tested Cleaning

Wheelabrator Special Cabinets equipped with 4 Wheelabrator units and various work handling systems for cleaning practically any commercial product.

Wheelabrator Tumblasts
Wheelabrator Tablasts
Wheelapeening (shot peening) Machines
Airblast Room and Cabinets
Metal Washing, Rinsing, and Drying Machines



UR PROVING GROUND R BLAST CLEANING PROBLEMS

A NATURAL MECCA for friends and customers seeking the solution to metal cleaning and finishing problems is the "American" testing laboratory. Hundreds upon hundreds of studies are conducted there each year.

Built and equipped at a cost of nearly a quarter of a million dollars, this is the largest and most complete department of its kind in the blast cleaning industry.

Our storehouse of experience is based upon intimate contact with thousands of commercial blast cleaning applications. It is your assurance of competent assistance in working out the practical answer to your problem.

Whatever that problem may be—whether large or small—come to American for recommendations. Our entire facilities are at your disposal and we invite you to make use of them. We want you to feel that doing so implies no obligation on your part.

A staggering pileup of bronze castings awaiting cleaning was eliminated at a Canadian jobbing foundry with the installation of a Wheelabrator. Because complete orders can now be shipped, the accounting department reported that they are sending out 40% less invoices than they did before the Wheelabrator was added to their production setup.

Workers at the Messinger Mfg. Co., Tatamy, Pa. discovered where gray iron castings got their name shortly after a Wheelabrator was installed in the foundry. One of the men amazed at the perfectly clean castings exclaimed, "I often wondered why they called these castings gray iron, but now I know because the Wheelabrator cleans them up. When we used old tumbling barrels the castings were more black than gray."

The Oil Well Supply Co., Oil City, Pa., cleaned more heavy castings in one 8-hour shift in their Wheelabrator than they could possibly have cleaned in an entire week (56 hours) with two airblast rooms. In addition, faster machining and grinding, simplified inspection, and lengthened tool life result from Wheelabrator cleaning.

WORLD'S LARGEST BUILDER OF AIRLESS ABRASIVE BLAST EQUIPMENT

American

FOUNDRY EQUIPMENT CO.

505 S. BYRKIT ST. MISHAWAKA, IND.

(*Concluded from page* 104)

been named eastern sales manager of the aluminum division, in New York.

♦ ♦ ♦

J. N. Moorhead has been named manager of the Buffalo Works, American Magnesium Corp., Cleveland, subsidiary of Aluminum Co. of America. **A. H. Hinton** has succeeded him as manager of the parent company's Cleveland Works sand foundry.

♦ ♦ ♦

Wilbur A. Lazier, formerly research group leader in the chemical department, E. I. du Pont de Nemours & Co., has been made director of Southern Research Institute, which will establish laboratories at Birmingham, Ala.

♦ ♦ ♦

James S. Rose, formerly supervisory methods engineer in charge of heating and ventilation, Curtiss-Wright Co., Buffalo, has been made manager of the enlarged San Francisco branch office of Ilg Electric Ventilating Co., Chicago.

♦ ♦ ♦

Thurlow E. McBride, formerly treasurer of American Engineering Co., Philadelphia, has been elected vice president and treasurer of the company.

♦ ♦ ♦

T. D. Stay, for 27 years active in metallurgical work for Aluminum Co. of America, Cleveland, now is associated with Reynolds Metals Co. Inc., Richmond, Va., and will take charge of a new research laboratory which the company plans.

♦ ♦ ♦

Clyde R. Dean, assistant treasurer and office manager of the Electric Steel Foundry Co., Portland, Oregon, has been elected to membership in the Controllers Institute of America.

F.E.M.A. To Meet at Hot Springs

Annual meeting of the Foundry Equipment Manufacturers Association will be held at the Homestead, Hot Springs, Va., Oct. 13-14. The program will be devoted to discussion of various problems now facing the equipment industry, reports of various committees and the consideration of postwar developments.

The session on Friday will include a report by the president of the association, Ralph W. Hisey, vice president in charge of manufacturing, Osborn Mfg. Co., Cleveland; a discussion of the War Production Board and its relationship to foundry equipment by Bradley Stoughton, who heads the Foundry Equipment Section of the WPB; a discussion by a representative of the Surplus War Property Administration of plans for the disposal of surplus foundry equipment by a representative of the Surplus War Property Administration; a discussion of the Office of Price Administration and foundry equipment problems by Riley M. Simrall, commodity specialist of the OPA; reports of committees, and the election of directors. The annual dinner will be held Friday evening.

The Saturday morning session will include a roundtable discussion on the state of the foundry equipment industry; a discussion of how it can help the foundry industry in the postwar period, by Arthur J. Tuscany, executive secretary of the F.E.M.A., and a presentation of postwar market studies for foundry equipment by J. M. Lathrop, advertising manager, THE FOUNDRY.

All manufacturers of foundry equipment are cordially invited to attend this meeting.

AIR DEPOT FOUNDRY IS HOME-MADE

Soldiers at the Central India Air Depot not only make a number of the castings they require to keep their planes flying against the Japs, but they also built the foundry where these parts are produced. According to an article by Fred B. Barton, war correspondent, in the Lincoln Electric Co.'s magazine *The Stabilizer,* this is believed to be the only depot equipped with its own, home-made foundry. The depot also has its own wood pattern shop.

Equipment for the foundry was fashioned to a large extent from scrap. Molds are made of native sand in wood flasks, using molasses as a binder. The view at right below shows the variety of castings being produced. A pouring scene, with a native assisting with the ladle, is shown at right.

Official Army Air Force photos, courtesy of Lincoln Electric Co., Cleveland.

NOW...ANOTHER REVOLUTIONARY PRODUCT OF PHILCO BATTERY RESEARCH!

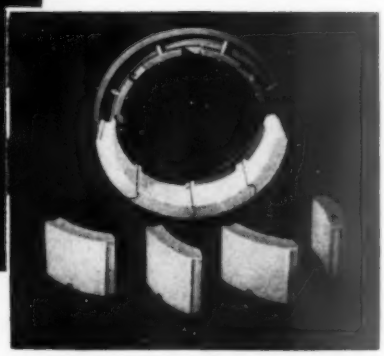
The New "PHILCO Thirty" gives 30% Longer Life

A few months back Philco pioneering gave industry the outstanding development in stationary batteries—Philco Vitrabloc. Today, Philco engineering research scores again—with the top advance in motive power batteries—the new "Philco Thirty." With 30% longer life, and *more*—with new economy in maintenance and lower depreciation—here is headline battery news. Here, for the first time in any battery, is a revolutionary new principle of fabricated insulation—developed, proved and backed by Philco. Here, too, is that famous 10% extra work capacity made possible by Philco's modern plate design. Ready today, is this great new post-war battery—the new "Philco Thirty"—now available in certain types and limited quantities. Write for full information.

PHILCO CORPORATION, *Storage Battery Division, Trenton 7, New Jersey*

For 50 Years a Leader in Industrial Storage Battery Development

LET'S RING IT AGAIN!



Every Sterling Grinding Wheel We Make Is Dedicated To Limitless Progress In A Free, Unshackled America

America is at the cross-roads. Never before has a Presidential election meant more to the future of our country. Where we put that "X" on our ballots is mighty important this year! The issues to be decided are not of the moment, but may alter for all time our established, American way of life. The results of this election are far-reaching . . will affect you, your children and their childrens' children. This year's vote is both a national and personal matter.

Whatever happens, capitalism will remain. It is the bedrock of our Democracy . . as essentially democratic as the town pump! Neither labor nor management would change our economic set-up, because both realise our capitalistic system has made us the greatest nation on earth. The "common man" in America has uncommon advantages that outweigh all "isms". However, there are different kinds of capitalism. Under the one, you make your own decisions; under the other, they are made for you.

America is in favor of private enterprise—freedom for G. I. Joe to return home, start a business, and prosper without unwelcome help . . or interference. America wants open competition—an unfettered opportunity to put our billions to work on profitable investments. America is in favor of unrestricted liberty for all—not domination by any group—government, labor, or management!

Yes, your vote is important this year! It calls for serious thinking. Every American has a stake in the decision you make as you enter the voting booth. All of us must ask ourselves what we are about to gain, not what we are about to lose.

The Liberty Bell—let's ring it again!

• STERLING ABRASIVES •

THE STERLING GRINDING WHEEL DIVISION
OF THE CLEVELAND QUARRIES COMPANY
TIFFIN, OHIO

THE WHEELS OF INDUSTRY

Gray Iron Founders Nominate Directors

Nominating committee of the Gray Iron Founders' Society will present the following selection for directors of the society, to serve three years, at the annual meeting to be held Oct. 10-11 at the Netherland Plaza Hotel, Cincinnati: Geo. H. Alten, Alten's Foundry & Machine Works, Lancaster, O.; Homer Britton, vice president, Cleveland Foundry Co., Cleveland; Max Kuniansky, vice president, Lynchburg Foundry Co., Lynchburg, Va.; S. D. Russell, president Phoenix Iron Works, Oakland, Calif.; H. A. Stockwell, treasurer, Barbour-Stockwell Co., Cambridge, Mass.; and F. L. Williams, assistant secretary, Cooper-Bessemer Corp., Grove City, Pa. These men, to be voted on at the business session, will succeed those whose three-year terms have expired.

The two-day conference will be concerned not only with current and postwar problems of the gray iron castings industry but also with the difficulties that probably will arise during the transition period when war demands have slackened.

Foundry Data Given In Handbook

Fifth edition of *Facts for Foundrymen*, dedicated to foundrymen and their many problems by Ernest G. Jarvis and Herbert O. Jarvis, the Niagara Falls Smelting & Refining Corp., Buffalo, has just been issued and is available at $1 per copy. Practical information, tables, specifications, etc., are presented on ferrous and nonferrous metals. Scope of the work may be inferred from the general index arranged alphabetically: Aluminum and its alloys; copper; intermediate alloys; iron, cast, malleable and pig; lead; melting points of metals; metals that please; metric conversion table; muntz metal; nickel; S.A.E. specifications; shrinkage allowance for patterns; test bars; tin; volume and weight conversion table; weights of common alloys, weights of materials and liquids; zinc.

Book Review

Mechanical Springs, by A. M. Wahl, Westinghouse Electric & Mfg. Co., cloth, 435 pages, published by Penton Publishing Co., Cleveland. Price $6.

This is a complete text on the design, selection and specification of springs. The need for this book has long been felt by the machine design profession and that need has been given considerable emphasis in recent years by the demands of modern machines for more and more precision in design and construction.

Dr. Wahl has been most thorough in his searching analyses of just what goes on in all kinds of springs under all kinds of conditions. His data are based on research conducted not only by himself, but by many contemporary authorities in the spring field.

Dealing first with the more elementary considerations, the discussion proceeds to helical tension and compression springs, Belleville, flat and leaf, torsion, spiral, ring, volute and rubber types, giving complete coverage to all phases of their design, selection and specification. The many graphs and tables presented give the reader quick access to stress, deflection and loading values and abundant drawings and photographs are employed to qualify the discussion throughout.

SAE Handbook 1944, cloth, 744 pages, 5½ x 8¼ inches, published by the Society of Automotive Engineers Inc., New York. Price $5.

This volume is the official publication of the Society of Automotive Engineers Inc. which contains the current standards of the society as well as its recommended practices, except those specifically pertaining to aeronautical use which are published separately. It is divided into 10 sections covering such phases as units, parts and fittings; processed materials; fabricated materials; screws, bolts and washers; tests, ratings and codes; transportation and maintenance; tools and production equipment; nomenclature, tolerances, conversions, etc.

Of particular interest to foundrymen are the Society for Automotive Engineers standards for cast materials. Those include one on malleable cast iron, one on automotive gray iron castings, 22 on aluminum alloy castings, 5 on magnesium alloy castings, and 17 on brass and bronze castings. Data are given on chemical composition, physical properties, and general information such as application, etc. Reference tables also are included to show the relationship between SAE and other specifications.

Acquires Plating Works

Precision Castings Co. Inc., Syracuse, N. Y., has acquired the Kalamazoo Plating Works Inc., Kalamazoo, Mich., as a wholly-owned subsidiary. The former also has die casting plants at Fayetteville and Syracuse, N. Y., Cleveland and Kalamazoo. Stanley C. Frost will continue as president of Kalamazoo Plating Works Inc., and C. M. Hyde has been appointed vice president and general manager. W. C. Berry also has joined the Kalamazoo organization. Both Mr. Hyde and Mr. Berry formerly were connected with the Stant Mfg. Co., Connersville, Ind.

Process Control in Foundry Industry

Society of Automotive Engineers Inc., 29 West Thirty-Ninth Street, New York 18, has published three booklets relating to process control procedure in the manufacture of malleable, gray iron, and steel castings. Compiled by the War Engineering Board of the society from the combined experience of engineers of the automotive and foundry industries, the booklets propose establishing process control as a preventive method of policing processes and of reducing rejections and scrap. It also urges co-operation from design inception to completion of castings.

Safety Bureau of the Metropolitan Life Insurance Co., New York, 10, has issued a report entitled "Developing Safe Employees," which is based on a study of accident-prevention activities in a number of industrial organizations. Copies are available upon request.

SCHEDULING PRODUCTION: To help alleviate manpower problems by careful planning and advance scheduling, the American Brake Shoe Co., New York, has devised and installed in its Meehanite Foundry the production schedule chart illustrated. Colored linen tapes of spring rewind type are soldered to clips screwed to the board. Man-days for each order are calculated as received and totaled according to molding method required. The tapes are then extended to the corresponding number of man-days and held in position by a small hook, thus the entire molding capacity of the foundry is charted in advance and production may quickly and easily be scheduled accordingly

foundry DEVELOPMENTS

FIRE PREVENTION WEEK to be observed Oct. 8 to 14 is a good time to hold an employe fire-extinguisher drill. Simplest way is to have employes attend a demonstration where the various types of extinguishers on the premises are operated and their use on different classes of fire explained. However, where possible, it is better to let the workers discharge the extinguishers themselves under supervision so that they will get the feel of the operation. The demonstrator also can supervise recharging of each type of extinguisher at that time even though it is desirable that recharging and inspection be the responsibility of one or more trained men. Use of actual test fires adds to the interest of the demonstration, but it is not essential and in many places impracticable. If actual fires are to be set, permission, and if possible co-operation should be obtained from the fire department. Many firms hold frequent fire drills when the workers are trained in all phases of small fire fighting and salvage work, and are repaid by a marked reduction in fire losses. No business, however small, can afford to neglect holding at least one employe fire drill a year.

• • •

RESEARCH investigations carried on by the Tin Research Institute (London) in behalf of the British Ministry of Supply is said to have developed a new technique whereby a wide range of cast irons can be hot-tinned successfully. Due to war conditions details of the procedure are not divulged except to British firms engaged on war contracts, but it is claimed that the tin coatings are smooth and glossy, and possess good adherence to the cast iron base. Tests indicate that with normal methods of tinning adherence of tin to iron ranges from zero to 1.5 tons (3360 pounds) per square inch while with the new technique adhesion values range from 3 to 4 tons (6720 to 8960 pounds) per square inch. It is said that the procedure is in many cases simpler than the usual methods used.

• • •

SUGGESTED way to kill two birds with one stone is described in U. S. Patent No. 2,336,020 which states that iron and steel articles can be cleaned and made rustproof in one operation by abrasive blasting with ferrophosphorus as the abradant. Either the blast furnace product containing 17 to 18 per cent phosphorus, or the electric furnace product containing 22 to 25 per cent phosphorus may be used. The material is ground to 4 to 20 mesh size and used in air or centrifugal type blast units. Operation may be conducted cold, or both metal being cleaned and ferrophosphorus grit may be heated to 930 to 1100 degrees Fahr.

• • •

PORTABLE steel gratings which can be slipped into heat-treating furnaces as easily as a housewife slips a pie pan into the oven, have stepped up production of small steel parts at New England Metallurgical Corp. In the past the parts were loaded on fixed grates in the furnaces

and treated at 1050 degrees Fahr. Idea of the removable steel grates or trays was developed by A. D. Bach, president of the New England firm and F. R. Gleason, sales engineer, Irving Subway Grating Co., Long Island City, N. Y. Gratings are 36 inches square, and are loaded outside the furnace. While one batch of small parts is being treated, another is being made ready.

• • •

AN IMPROVED high-speed copper plating process which is claimed to reduce operating costs and speed up production rates has been developed by E. I. du Pont de Nemours & Co., Wilmington, Del. Previously the firm introduced a copper plating process utilizing a carefully compounded and controlled sodium copper cyanide bath which permitted heavy deposits of copper in a short time. Gains in the improved process were achieved by working out a method for substituting potassium cyanide and other potassium salts for the sodium salts previously used with further increases in current densities. Development of methods for producing the potassium salts in this country, and technical advances in their use in plating baths, made the substitution possible.

• • •

NOISE usually associated with the operation of a cleaning room in the foundry makes it difficult at times for the operator to hear the horn attached to certain types of equipment to indicate the end of a definite time cycle. A signal lamp which flashes on simultaneously with the horn, is installed easily and attracts the operator's attention.

• • •

INTEREST in the so-called investment molding process for production of castings, particularly the high melting point alloys, to close dimensional tolerances has led to the development of numerous refractory molding compositions or as they are called "investments". A recent one described in U. S. Patent No. 2,345,211 is comprised of 85 to 97 per cent silica, 3 to 10 per cent magnesia, 10 per cent phosphoric acid (40 per cent strength), and 0.1 to 1 per cent aluminum as the metal or a salt.

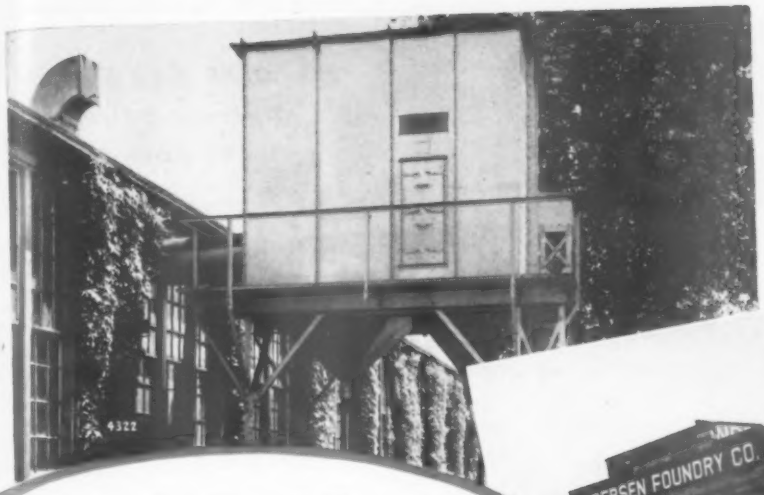
• • •

FURTHER development in the field of insuring sound castings by keeping blind risers open is described in U. S. Patent Nos. 2,334,701 and 2,335,008. Method involves use of specially shaped sand cores containing coal or coke dust to provide combustible material. Those are placed over the blind riser, and are designed to keep the riser open to atmospheric pressure, and permit inspection to see that they function properly. Application is more particularly for large castings.

• • •

WITH THE development of the molten-salt bath process for cleaning gray cast iron so that it may be tinned thoroughly and bonded to babbitt bearing metal, the Cooper-Bessemer Corp., Mount Vernon, O., obtained some interesting results with cast iron backed bearings. One set of bearings made of cast iron backs with 1/32-inch babbitt ran over 1400 hours under adverse conditions. In another test where previously only tin-base, tri-metal bearings (steel-bronze-babbitt) would last, it was found that cast iron back bearings lined with 1/32-inch lead-arsenic babbitt (17.5 per cent antimony, 1 per cent tin, 1 per cent arsenic, 0.4 per cent copper and remainder lead) stood up 900 hours without failure. Opinion is that the cast iron backs have something to do with the babbitt standing up.

E. B.



Close-up of Sly Dust Filter.

Sly Dust Filter alongside of foundry building. Fan is inside of building with exhaust pipe shown above roof.

SLY DUST COLLECTOR Improves WORKING CONDITIONS In Busy Foundry

Close-up of end of Sly Dust Filter showing shaker drive, housing and support.

THIS collector was purchased 15 years ago to collect dust in foundry operations from a blast mill, two tumbling mills and seven grinders. It is still being used for the same purpose.

"It does its work very well," says the Andersen Foundry Co. It maintains good working conditions so that the men can work to advantage and like it. It is economical on maintenance and power.

Sly Dust Filters provide exclusive advantages in (1) greater filtering capacity, (2) saving power, (3) easier bag replacement, (4) automatic control, and (5) savings in operation and maintenance.

Ask for Bulletin 98 and tell us your problem so that we can write you fully.

THE W. W. SLY MANUFACTURING CO.
Since 1874
4753 Train Avenue Cleveland 2, Ohio

SLY INDUSTRIAL DUST CONTROL

TUMBLING MILLS * BLAST CLEANING EQUIPMENT

around DETROIT

BY A. H. ALLEN
Detroit Editor,
The Foundry

Gray iron castings to continue where they left off before the war as basic components of motor cars. . . . Signs of activity around foundries of large motor companies point to coming resumption of operations for civilian automobile production.

AS THE day approaches for resumption of automobile production—and it cannot come too fast to suit Detroit—it may be appropriate to review the automotive foundry picture, since gray iron castings have been and will continue to be basic components. There has been a lot of flowery talk about aluminum taking over most of the gray iron in automobiles, but just write this off as nonsense. Cost, more than ever, is going to be the gage in choice of materials, and there is ample opinion to support the belief that even if it were possible to obtain aluminum free of charge, it would not replace much gray iron in passenger cars. Pistons may possibly revert to cast, or even forged, aluminum, but you can get argument on this score. Metallurgists will tell you the principal reason for the original use of aluminum in pistons was to reduce bearing loads, and now that superior bearing materials have been developed (copper-nickel powder sintered onto steel backing for example), cost considerations may keep pistons in gray iron.

Show Signs of Activity

A quick look around the foundries of the large motor companies will show signs of activity pointing to the resumption of production. The large Chevrolet Gray Iron foundry division in Saginaw, where the principal activity in recent months has been production of magnesium castings, shortly may see this work terminated, and since it occupied only a small portion of the foundry, a shift to gray iron would not be long in forthcoming. In fact, suppliers report a few "feelers" on equipment which would indicate plans are now in the stage of crystallization. Certainly, if Chevrolet is to be the first producer out with new cars, the gray iron division will have to start humping soon.

Buick's foundry has been in limited production of iron for several months and likely can shift to something like normal automotive output without too much difficulty. Castings thus far have been blocks and heads for Hercules engines used in landing craft, but it is understood some Buick service parts castings have been moved in lately. No plans are reported for expansion of melting capacity, since the present bottleneck is the coreroom and it would be pointless to add to cupola capacity. Buick's handsome new aluminum foundry continues in production, and has undertaken several new castings for the Packard-built Rolls-Royce aircraft engine.

Engineering details for installation of two new cupolas with accessory handling and conveying equipment have been all wrapped up and set on the shelf at the Pontiac foundry for many months. While orders have been placed, they of course carried no priority and equipment interests could do nothing but drool over them anyway. Now, however, with the WPB apparently relaxing its controls over reconversion of industry, early action is anticipated.

It is the old story of government by press release, under which industry in this country has squirmed for so many years. Directives and authorizations from Washington are always first released to the newspapers to give the public the idea that this action or that action has been formalized, but actually it is weeks and perhaps months before the "press release" has percolated down through the WPB and other agencies sufficiently to permit the authorized action to take place. Meanwhile, the top government officials can bask in the glory of having approved something which pleases the people, and industry can be neatly saddled with the responsibility for any ensuing delays. That is exactly what industry has today—responsibility but not a trace of authority.

Increase Milling Capacity

The Cadillac foundry in Detroit likewise is readying ambitious plans for a reorientation and modernization of its plant. A Cleveland foundry engineer has been retained to work out details which include turning the entire foundry around 90 degrees (within the building of course), adding two new cupolas to the present bank of four, and installing the necessary handling, conveying, sand conditioning, molding and related equipment. Capacity likely will be upped by about 50 per cent.

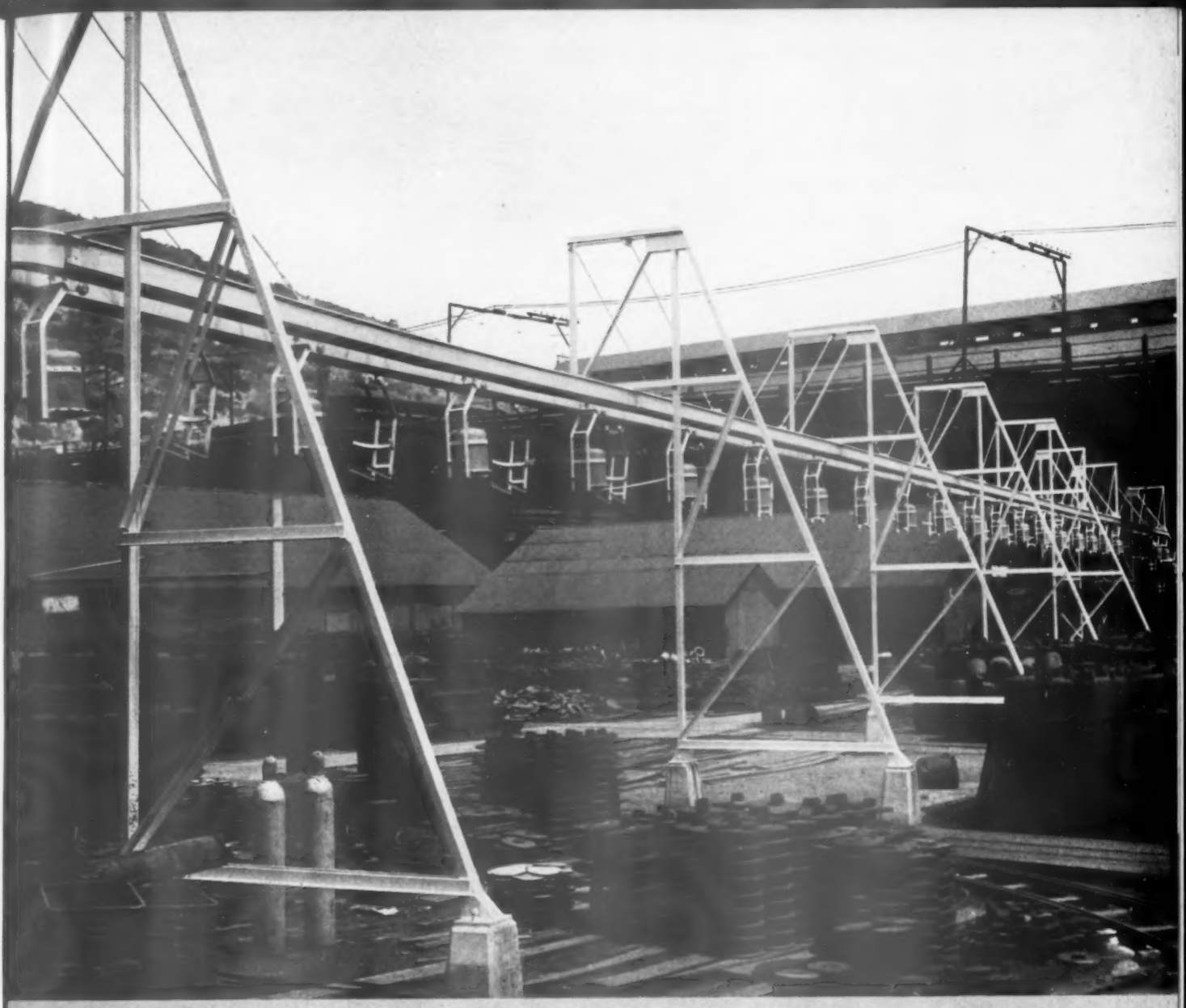
This just about covers the General Motors list, except for Saginaw Malleable Division, which has been in the throes of installing a variety of new equipment, but for some reason at the moment is "proceeding cautiously," as one of its men explains. This is not to infer that production is lagging, but rather that some equipment ordered and shipped months ago still is awaiting installation. The division's Danville, Ill., branch is humming, and after about four months of steady production, is turning out around 100 tons a day. The plant building itself began taking shape last December. Principal product is malleable iron axle housings and different carriers for heavy military trucks, output going chiefly to the nearby plant of Standard Steel Spring Co., which is building the complete axles on subcontract for Timken-Detroit Axle Co.

Plant Is Highly Efficient

The Danville plant is built along the most modern lines, boasting the latest innovations in conveying and handling equipment, as well as a full complement of dust collection and other devices for abating the smoke and dust nuisance. Employment runs around 600 men and women, recruited from the area, and according to expressions of the top GM management at a recent formal opening of the plant, is of uniform high quality and skill—which is saying something for foundry help these days. It is hoped the Danville unit can be kept a part of GM Illinois operations after the war.

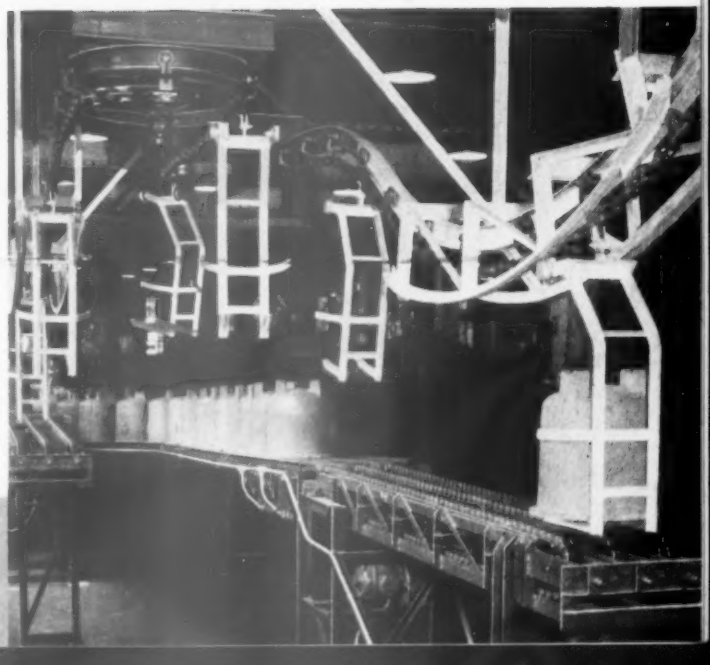
Turning now to the Chrysler picture, the only integrated source for gray iron is the Dodge main foundry which has kept in production right through the war period, supplying components for engines used in trucks and marine equipment. Despite reports that Dodge has its postwar production schedules and parts buys virtually ready for release, little is heard of any changes in the foundry side. The Dodge foundry operates in comparatively cramped quarters, and company officials have actively discussed moving elsewhere for at least the past 15 years, but nothing has ever come of these discussions. At one time, the rumor was that a new foundry would be built at

(*Concluded on page* 116)



Put Mathews Methods Into Your Post-War Plans

he need for special devices in conveying systems, increased uring these war years of fast and tremendous production, has und Mathews Engineering ready and eager for the job. Fre-uently, the conveying problems have been entirely new. lways, they have been different in some respects from even e most similar jobs in the past. The conveyers were needed uickly and the need was great. To meet this need, Mathews ngineers and production personnel have hammered away eadily, meeting these problems as they came, and solving em. As a result of this activity — these new problems — these pecial devices which were developed — many years of experi-nce have been packed into a short while. That is why Mathews ethods are up to the minute. This experience is available, rough the Mathews Field Engineer, in all principal cities in e United States and Canada.



Mathews Conveyer Company

LLWOOD CITY, PENNSYLVANIA

Marysville, Mich. Next Dodge engineers reportedly were sharpening their pencils to see how they could revise the floor layouts and squeeze this or that equipment between closely spaced columns.

Two principal outside suppliers for Chrysler are the New Haven Foundry Co., New Haven, Mich., on smaller parts, and Lakey Foundry & Machine Co., Muskegon, on the bigger castings like blocks and heads. Both of these sources probably could be rushed back into automotive production without too great an effort.

Ford foundry capacity continues to be ample, though there are some changes in the making, involving principally the ripping out of two forehearth cupolas which, while they were operated successfully, have been more than a little difficult to keep in repair. As one local jokester puts it, "It took the departure of Charlie Sorenson to get those forehearths out of there." They are being replaced with two standard-type cupolas.

What will ever become of the huge Ford armor steel foundry is a difficult question to answer. It never operated at much more than 30 per cent of its designed capacity and is, of course, a government facility. At the moment, some malleable production is being handled there, using some of the large battery of car-type annealing furnaces for malleableizing. Some observers think the plant might be adapted to production of malleable parts such as banjo housings, but revisions to the heat treating setup would be required, and the plant appears far too big for such limited operations. Its immediate future is obscure.

Packard's foundry shortly will be in production of gray iron for service parts and undoubtedly for new car castings. Thorough checks have been made on long-idle equipment such as scale cars, buckets, cranes, conveyors, etc., to make sure that everything is shipshape for resumption of production.

Studebaker's gray iron foundry at South Bend has been in continuous production on castings for engines used in trucks and other military vehicles, one of which is the Weasel, a three-passenger personnel or cargo carrier built in both land and amphibious versions and powered by the same engine used in the company's light Champion car. Thus, the reconversion problem here is virtually nonexistent, one of the few plants where this is true.

Wilson Foundry & Machine Co. at Pontiac, has just about completed a modernization program involving something over $1,000,000 and shortly will be in revitalized production under direction of its new manager, Leon Thomas. It will be the source for castings used in Willys cars and jeeps, with a schedule of something like 40,000 of the latter now in the works for the first postwar year of production.

The Nash foundry at Kenosha, Wis., as detailed here last month, is resuming production of gray iron, and while as foundries go it is not in too bad shape, the plant will likely be earmarked for early rebuilding.

M. L. Gardner, for the past two years president and manager of the Marshall Furnace Co., Marshall, Mich., has undertaken new duties as president, general manager and member of the board of Detroit Gray Iron Foundry Co. If his record at Marshall is any indication, Detroit Gray Iron should flourish under his direction. He still retains ownership of the Michigan Metal Products Co., Battle Creek. About 65 per cent of present production at Detroit Gray Iron is steel, and operations overall are estimated at about 60 per cent of capacity. There has been only a smattering of automotive die work as yet, but in recent weeks some new jig and fixture castings have been released, probably in connection with tank and tank destroyer projects.

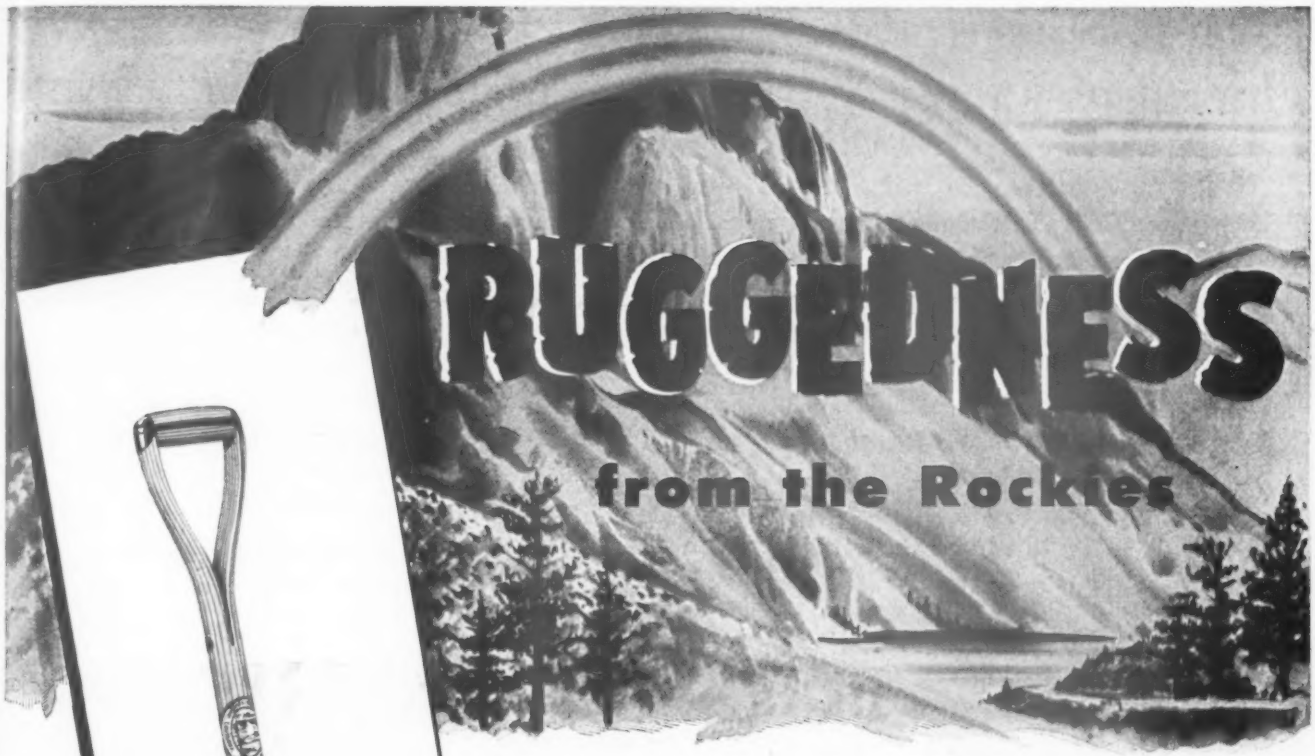
Possibilities for the future of the investment type of casting, such as described here recently in connection with new activity of Michigan Steel Casting Co., are shown by a recent job made by this method—a steel mold for production of spark plug porcelains. These molds are used by the thousands monthly and more were formerly machined and ground from tool steel. By the investment casting technique the molds are produced to precision dimensions, using old broken molds as melting stock, and a saving in finishing is realized to the extent of about $3 per mold. In fact, the only finishing necessary is a slight grind on the inner surface.

P.S. When asked what a certain XXXXX Foundry Co. was producing these days, a source close to the company replied with more truth than poetry, "They are making everything but money."

MANPOWER REPLACEMENTS: For more than a year Hamilton Foundry & Machine Co., Hamilton, O., has employed women for work other than clerical jobs. Women in uniform in the group shown work in the coremaking, pattern, molding, cleaning and shipping departments. Two of them are crane operators. At the right are the company's registered nurse and two janitresses. About 30 boys, 16 and 17 years old, also have been working for some time to help solve the manpower shortage, either full-time or part time, and many have proved excellent workers. Of the boys shown above about half are continuing work instead of returning to school, and most of the others are staying on a part-time basis

Erie, Pa., Observes "Foundry Week"

Erie, Pa., observed "Foundry Week" during the week of Aug. 27 to Sept. 3, with civic officials headed by Mayor Charles R. Barber participating in the program which was intended to call attention to the urgent demand for castings for war purposes. Emphasizing the need for additional manpower in local foundries, the city's proclamation urged available workers to seek foundry employment, and called upon foundry workers to maintain the fullest production possible. The week's program included rallies at various foundries where returned war veterans were guest speakers.



MAKES WOOD'S Moly REG. U.S. PAT. OFF. SHOVELS

OUTWEAR ALL OTHERS!

Magic Mo-lyb-den-um, the miracle mineral mined in the Colorado Rockies, gives Moly Shovels, Spades and Scoops a rugged toughness that even outwears that of the granite peaks among which Mo-lyb-den-um is found.

Moly Shovels, Spades and Scoops, with blades of Mo-lyb-den-um alloy steel made to Wood's own special analysis, have won world-wide reputation . . . have earned exclusive world rights to the name Moly.

Buy these stronger, tougher shovels and watch your shovel costs go down, down and down. Moly means more wear . . . Moly shovels are unconditionally guaranteed to outlast, out-wear all others.

Illustrated: Moly Closed-Back Moulders Shovel—with Steel I-Beam Handle Reinforcement.

THE WOOD SHOVEL AND TOOL CO.
PIQUA, OHIO

A National Organization Specializing *Exclusively* in Shovels, Spades and Scoops.

Moly REG. U.S. PAT. OFF.

MO-LYB-DEN-UM ALLOY SHOVELS

Chips Fly Faster With Blue Flash Snagging Wheels

On floor stands and swing frames from coast to coast, these rugged snagging wheels are demonstrating the *extra value* of their special bonds and "controlled porosity".

Bay State's vitrified and resinoid bonds with their bulldog tenacity and endurance have been developed to satisfy repeated calls by skilled craftsmen and "green hands" alike for wheels of extra strength.

"Controlled Porosity" in several different degrees, gives Blue Flash Snagging Wheels a full range of grinding grades for faster, cooler production. This precise method of spacing cutting units also assures exact duplication of wheels.

With Bay State Blue Flash Snagging Wheels (regular, portable or dual-purpose) you can meet the challenge of "last round" war orders . . . and hit a new high in production records. Their *extra features* are proving their worth. Get all the facts. Write for Bulletin B today . . . then make your own test.

BAY STATE ABRASIVE PRODUCTS CO.
WESTBORO, MASS.

Heating Ventilated Industrial Buildings

By DAVID HENDERSON
Sales Engineer
Dravo Corp., Pittsburgh

HEALTHFUL breathing conditions increasingly are becoming a basic requirement in the industrial field. In the heavier industries more than usual interest is being shown in the effective elimination of dust, obnoxious gases, acid fumes, and unpleasant odors by providing suitable ventilation. The plant engineer studying this problem is faced with the fact that every cubic foot of air vented has to be replaced with one cubic foot of fresh air. In summer this presents no problem, but in the winter this cubic foot of fresh air usually will be too cold for comfort. The temperature of this air may be zero or below. Bringing such air into the building in quantities will set up uncomfortable working conditions. This air must be heated or tempered first, and special provision made for its introduction. Its temperature must be raised to at least room temperature. Amount of heat required will depend, of course, on the quantity of air handled and the temperature rise.

Heat required to raise the temperature of makeup air from 0 to 70 degrees Fahr. totals about 7,500,000 Btu per hour, when such air is brought in at the rate of 100,000 cubic feet per minute. This rate of ventilation is quite common and for that matter is greatly exceeded in many cases. In terms of boiler capacity, 100,000 cubic feet per minute requires about 225 boiler horsepower during zero weather conditions.

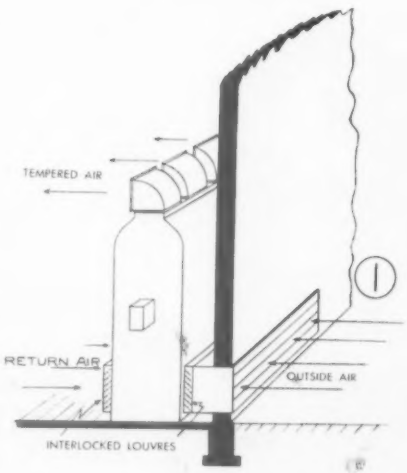
A multiplicity of air changes per hour often is necessary to attain proper breathing conditions. Thus all of this heat put into the makeup air is in the building only a short time and then is thrown away. In terms of a winter's operation, a ventilation rate of 100,000 cubic feet per minute represents an annual expenditure of many thousands of dollars for heat. Under such conditions the aim should be: 1. To reduce if possible, the rate of ventilation without interfering with proper breathing conditions. 2. To use low-cost heat.

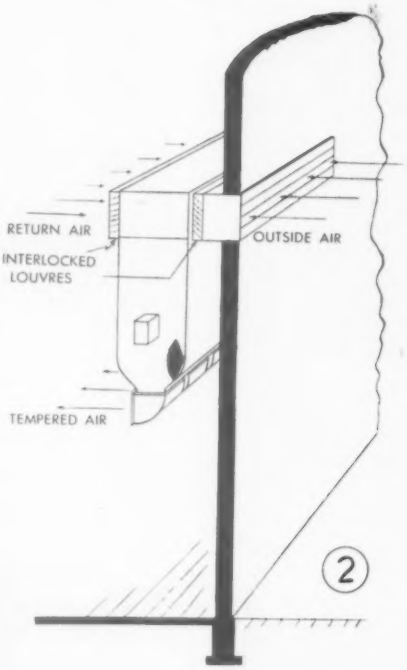
Devising ways and means of reducing the ventilation rate is something the plant engineer is best able to do, being acquainted with the local conditions. In many plants this rate is entirely too high and as a result valuable heat is wasted. If such plants can be taken as a criterion, an investigation into this should pay dividends. Every cubic foot of air exhausted should be made to count in removing contaminated air. Locating the ventilating equipment as close as possible to the source of contamination and avoiding short circuiting of fresh air to the ventilating equipment will help toward this end.

Ventilating equipment should be such that its rated capacity will not be affected materially by variations in outside wind velocities. Obtaining a 25 per cent or more increase in ventilation with an increase in wind velocity, while not objectionable in the summer time, has the objection in the winter time of that much more increase in heat loss. Venting should be under reasonable control.

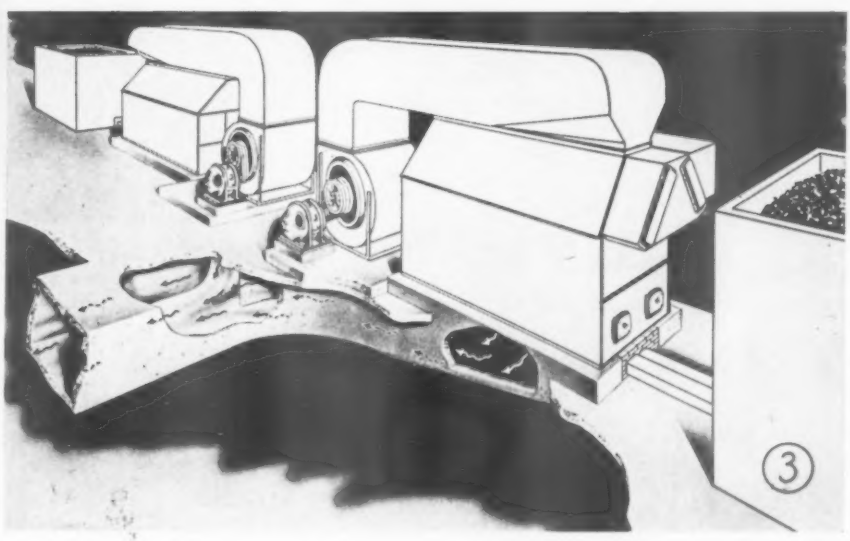
Low cost heat implies low initial and operating costs. Fortunately the choice of equipment is wider than formerly with greater opportunities of obtaining lower costs. The war years have seen for ex-

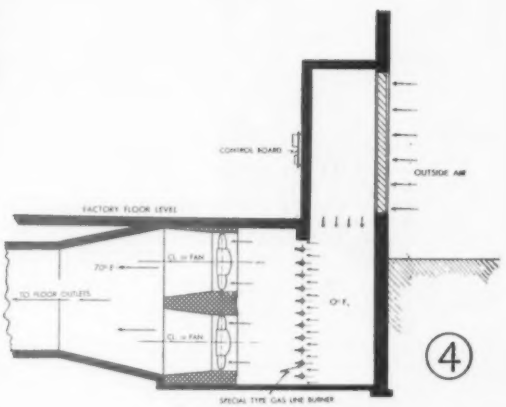
(*Concluded on page* 122)





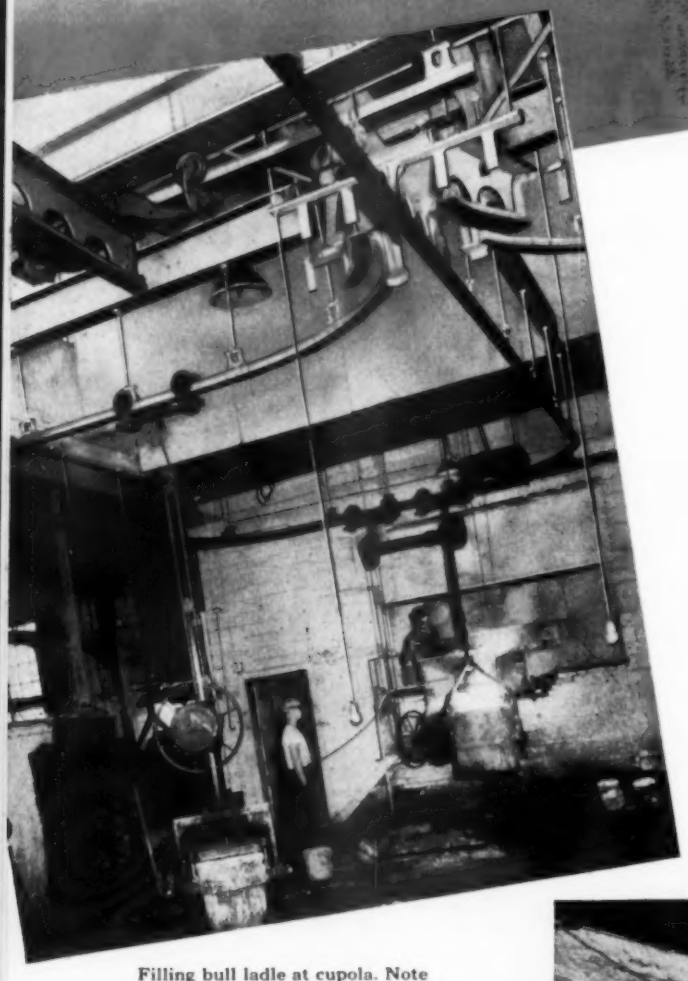
Figs. 1 and 2—Adaptation of conventional industrial type of direct fired unit heater to tempering of makeup air. Fig. 3—Battery of two coal fired heaters using stokers. Fig. 4—Diagram of tempering station with fuel burned directly in the air stream





Paul Pufahl and Son Foundry
CUPOLA

There's a New Day
FOR FOUNDRY WORKERS IN TWIN CITIES



Filling bull ladle at cupola. Note use of extended hand wheel chain hoist carrier that makes hoist chain more accessible and keeps it removed from contact with ladle. Overhead Tramrail loop eliminates any possible congestion of ladles at cupola.

Foundries everywhere are having difficulty keeping workers on the job. Experienced men are quitting every day for work that is easier. New men are nigh on impossible to obtain. Today there is a shortage of more than 20,000 foundry workers in the United States.

Paul Pufahl & Son Foundry operate a moderate size plant in Minneapolis. They have taken steps to alleviate this serious situation in their foundry and are leading the way in the Twin Cities.

Realizing that one of the big objections to foundry work is the heavy lifting and carrying of hot metal, they have installed equipment that will do this work mechanically. Now, during pouring, the workers need only to guide easily operated overhead equipment. No hard lifting. No carrying of heavy ladles.

Large molds are poured with bull ladles that carry metal direct from the cupola without repouring. Small molds are

Pouring with 200 lb. mechanical ladles on overhead Tramrail Cranes is simplicity itself. How much easier this is over old-type hand ladles for foundry workers. Fast too! Molds can be poured 2 or 3 times faster this modern way.

Small mechanical ladles while on overhead cranes are filled quickly, safely and easily by bull ladle. Each ladle is handled with an individual crane.

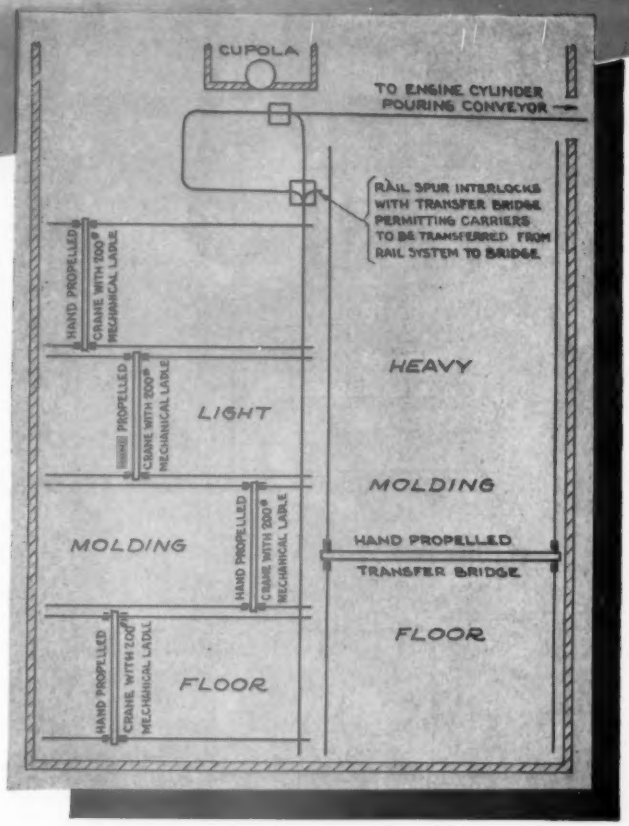
Paul Pufahl and Son Foundry Cuts Labor Turn-Over by Easing Work with Simple Overhead Tramrail System

poured with 200 lb. mechanical ladles that ride on overhead cranes. Four of these ladles replace many old type 50 lb. hand ladles.

While Cleveland Tramrail has long been used for various operations in hundreds of foundries, its application with light mechanical ladles for pouring small molds is new in foundry practise. Pufahl workers are enthusiastic about this equipment. Reduces their fatigue. Promotes their health. Leaves them fresher at the end of a day.

The Pufahl management is also happy over the results. Their labor turn-over is considerably less and their production greater. Molds can now be poured from 2 to 3 times faster than formerly.

Equipment as used at Paul Pufahl & Son is not expensive and costs little to maintain. It can be readily installed in most foundries with few or no structural changes. Many installations pay for themselves in a year or less.



Layout of Cleveland Tramrail System serving the Light and Heavy Pouring Floors of Paul Pufahl & Son Foundry, Minneapolis, Minn.

NOTES TO FOUNDRY EXECUTIVES

If You Now ARE Equipped with Cleveland Tramrail

If you now have Cleveland Tramrail, you know the many advantages you have over foundries not so equipped. You know how much you have speeded production, reduced costs, improved working conditions and aided safety. NOW YOU CAN SECURE EVEN GREATER BENEFITS. Replacing hand ladles with 200 lb. mechanical ladles riding on Cleveland Tramrail, is another tremendous advancement in foundry practise. With little additional expense you can obtain the important advantages that this method offers—advantages that are proportionally as great as you gained with your original installation. Check your local Tramrail representative on this.

If You ARE NOT Equipped with Cleveland Tramrail

If yours is not one of the hundreds of foundries equipped with Cleveland Tramrail, you most likely are operating at a serious disadvantage which will become very noticeable when the hard forces of peace-time competition are again with us. You will need the economies and benefits a well layed out Cleveland Tramrail overhead system can bring to you. You owe it to yourself, your company and your workers to at least get all the information—and experienced Cleveland Tramrail materials handling engineers will be glad to give it to you without obligation. Prepare today for tomorrow.

BOOKLET No. 2006 . . Packed with valuable information. Profusely illustrated. Write for free copy on your company letterhead.

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
1155 EAST 283RD ST. WICKLIFFE, OHIO.

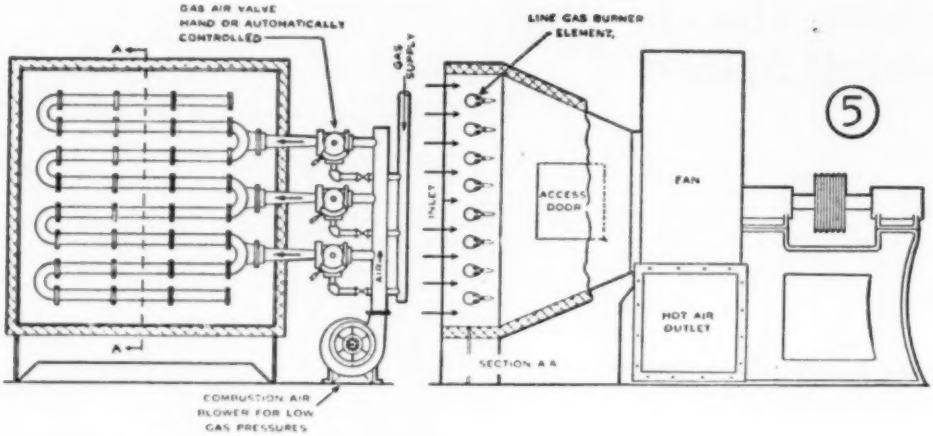
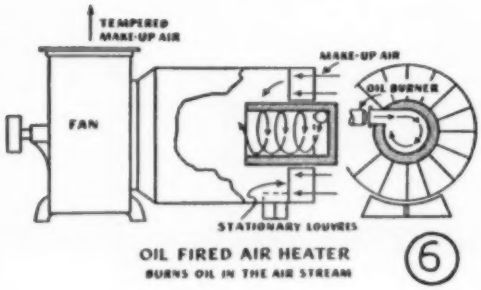
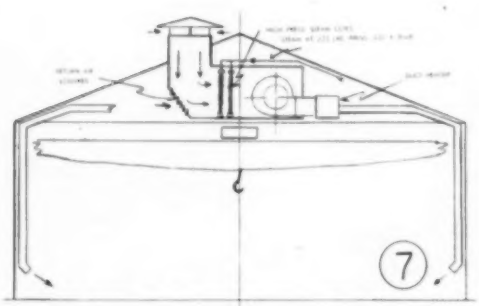


Fig. 5—Heater integral with blower type fan. Gas is burned in air stream. Fig. 6—Oil fired air heater which burns fuel in the air stream. Fig. 7—Central steam system located in roof truss, with air discharged into duct distributing system





(*Concluded from page* 119)

ample, a considerable increase in the use of direct-fired equipment for space heating, (by "direct-fired" is meant that air receives its heat direct from the fuel). Such equipment now is being used for tempering makeup air with very excellent results. It is fired with either oil, gas, or coal. Since conditions require a constant outlet temperature with a varying inlet temperature, modulating control of the burning of the fuel is necessary. Considerable and satisfactory progress has been made along these lines. Direct-fired equipment can handle air of almost any initial temperature without danger of freezing as it will be apparent there is nothing about it to freeze.

Figs. 1 and 2 show the adaptation of a conventional industrial type of direct fired unit heater to the tempering of makeup air. This heater is fired with either oil or gas. It will be noted the products of combustion do not mix with the air stream. Combustion takes place in a gas and air tight chamber and the waste gases are discharged to the outside. The units are built to deliver up to 20,000 cubic feet of tempered air per minute.

Coal fired heaters using stokers can deliver up to 100,000 cubic feet per minute of tempered air. Fig. 3 shows a battery of two such units delivering approximately 200,000 cubic feet of air per minute. Such units also are adapted for oil and gas firing.

The art even has been extended to the burning of fuel, (gas or oil) directly in the air stream, all resulting in still lower initial and operating costs, and using all of the heat in the fuel. One installation of this kind tempers air at the rate of 368,000 cubic feet per minute and has a total heating capacity of 32,000,000 Btu per hour. The building is devoted to welding operations in which a multiplicity of air changes are necessary to assure the proper working conditions. The load is handled by two tempering stations, and tempered air is delivered through floor outlets. Fig. 3 shows diagrammatically one of these stations. An accurate premixture of natural gas and air is burned, using a special type of line burner placed directly in the air stream. The modulation control provided functions up to a 2 degrees Fahr. difference between inside and outside temperatures. In other words, if the inside temperature is 70 degrees, the control will function up to 68 degrees outside temperature and then the gas is shut off. The tempered air is handled by axial flow fans. Each station handles 184,000 cubic feet per minute. The ratio of air to waste gases is about 50 to 1, resulting in a high degree of dilution. The final content of CO_2 is small and well within safe limits. There is no indication of CO. No odor is noticeable. Fig. 5 shows a heater of this type integral with blower type fan.

Light oil also is being burned in the air stream successfully. However, the products of combustion mix with the air stream only after complete combustion has taken place in a refractory lined furnace. Every effort is made to assure complete combustion before the waste gases mix with the cold air stream. The type of furnace used is shown in Fig. 6. Tangential firing, as shown, provides the necessary time element and turbulence. Here again the ratio of air to waste gases is quite high, resulting in a high degree of dilution. No odor is noticeable.

Conditions in the field will dictate the kind of tempering system to use. If steam is available, a steam system normally is the answer. If not, and new steam generating equipment is involved, lower costs may be found with direct-fired equipment.

Steam systems may take the form of a multiplicity of steam unit heaters distributed around the building with each unit connected to the outside air and each provided with individual modulating control, or it may be a central system involving one or more steam coil and fan combinations discharging into a duct distributing system.

One of the latest installations of the latter is being made in a steel plant building in which steam at full line pressure of 225 pounds per square inch and 500 degrees Fahr. total temperature is used in the steam coils. The coils are made up of straight steel pipe set vertically and welded into pipe headers. The pipe is finned heavily and is good for 800-pound pressure. The building has two tempering stations, each handling 120,000 cubic feet of air per minute and good for an output of 12,000,000 Btu per hour. A cross section of this installation is shown in Fig. 7. As will be noted, these tempering stations are located in the roof truss and discharged into a duct system with downcomers bringing the fresh tempered air to the breathing zone.

The basic advantage of using high pressure steam centers in the ability to use smaller piping, provided provision is made for cooling the condensate and avoiding losses due to flashed steam. This cooling effect can be obtained readily by inserting additional coil in the air stream. Furthermore, high temperature steam means less steam coil surface for generation of heat.

Burdett Buys Safety Equipment Firm

Burdett Oxygen Co., Cleveland, has purchased the American Industrial Safety Equipment Co., Brooklyn, N. Y. The latter will operate as a division of the Burdett company, continuing the manufacture and sale of industrial goggles, shields, gloves, respirators, and other related items at its Brooklyn plant.

The "MASTER" Line of Sand Rammers affords a Choice for Every Type of Service . . .

Four styles from which to select—floor, bench and core rammers—all maintaining the "MASTER" features of light weight, good balance and long life in service.

Note particularly the new F-2 with a lighter, faster stroke that makes it ideal for the molding of the light metal alloys. Also the new B-2 Core Rammer with the lighter, speedy stroke.

Now is the time to re-tool your plant for the competitive days ahead. Ask for more detailed literature on "MASTER" Sand Rammers.

An Exclusive "MASTER" Feature

gives three times normal life . . .

HARD CHROME Plating inside and outside cylinder and on piston rod with precision grinding before and after plating done by "MASTER" Experts.

"MASTER" PNEUMATIC TOOLS

MADE BY

MASTER TOOL COMPANY, INC.

5605 Herman Avenue • • Cleveland 2, Ohio

• SALES AND SERVICE FROM COAST TO COAST •

The adventures of BILL

BY PAT DWYER

Drawings By RICHEY

HAVE you ever noticed," I asked Bill the other night, "how the first news in connection with the activities of some person you know—possibly he may live next door, or anyway in the neighborhood—comes from a mutual friend or acquaintance, living thousands of miles away, in some instances half way round the world?"

"Why, yes," Bill admitted. I could see by the shifty, furtive foxy look in his eye that he knew perfectly what I had in mind. "That is a matter of common knowledge. Instances popping up all the time. At a friend's house recently I met a lady whose son had gone to school here with one of my boys. Then the army had grabbed both of them and shipped them in separate outfits and at different times, to the South Pacific. One day recently while No. 1 boy and a few cronies were engaged in a little light and innocent amusement, rolling the bones, who comes strolling into the tent, or camp or hut, or whatever it is, but boy No. 2. In celebration of the event, the regular crew skilfully and quickly stripped him of whatever money and negotiable property he had and told him how lucky he was not to have fallen into the hands of a gang of low scuts in the next tent, regular robbers without either morals or manners. I knew another fella one time—"

"I knew another fella one time too," I interrupted, "very adept in throwing out a smoke screen when pushed into a corner. Perhaps a better comparison would be to an octopus. When an octopus gets in a jam—and according to all accounts that is pretty often—he or she or it, discharges about a barrel of inky fluid into the water and then disappears."

"A barrel, hey? How big is an octopus?"

"Merely a figure of speech. If I wanted to be fussy about the thing, I might point out to you that a barrel might be any size from that of a toy bank to that of a sugar hogshead. The objection is totally irrelevant, immaterial, impertinent, inconsistent, innocuous, and—"

"And out the window you must go. I get it. You mean you do not know anything about the size, shape, weight or general dimensions of an octopus, so you attempt to cover up your ignorance in a barrel of empty words. Very poor technique. Does not get you anywhere. Take an example from me. The plain word, the simple statement. That's me. Plain Willie I was knowed as in the old home town, where parents held me up to their children as a bright and shining example of all the virtues."

"If you ask me, Pain-in-the-neck Willie would hit nearer the mark. Here you have been galivanting down East for a couple of weeks in the early part of the summer, and the first I hear about it is when I get a letter today from Slim McGonigle who says he ran into you one day on the main street and hardly knew you with a shave, a shine, a haircut and a new suit. Quite a contrast to the last time he saw you going home from work one night—"

"Just a little dab of jealousy," said Bill, dismissing the subject with a careless gesture. "You must not forget, my friend, that many a heart of gold beats inside a ragged pair of pants, and the laborer is worthy of his hire and all that there kind of stuff. Slim is a good old scout and between the two of us we raked over the ashes of many a vanished campfire that blazed up brightly in the days when we were 21.

"With the single exception that I was not sporting a long white bush, wearing a ragged pair of weather stained pants, or followed by a long, lean, hungry and mangey yellow dog, I felt somewhat like Rip Van Winkle when he came home after his 20 years' sleep among the little short fellas, the Gremlins up in the Catskills, or the Adirondacks, or wherever it was he hibernated to get away from his battle-axe wife Katrina. Certainly she was a doosy.

"Omitting all the other factors and basing a comparison merely on the elapsed time, I am away out in front of old Rip. It is now almost 50 years since I *drawed* my modest honorarium and back time from the Alma Mater. Not so good. What's the Latin word for black? You don't know? Well, that makes it unanimous. I know the gang was unanimously black leaving the shop each night. As I was saying when you interrupted me, or intended to interrupt me, it is almost 50 years since I drew my pay, picked up my bag of tools—most of them handmade by myself—folded my other suit in a newspaper and started—as the saying was in those days—to see the country and seek my fortune."

Something like Horatio Alger story

"Apparently," I said, "you were not familiar with the Rev. Russell Conway's famous lectures *Acres of Diamonds*."

"No. I can't say as I was or am. I worked one time with a fella by the name of Conway, but as he spent most of his leisure time in the jug, it is not likely that he ever wrote or presented a lecture, although I will say he was well qualified to discuss the contents and capacity of beer barrels, either by the jug or by the glass.

"At one time or another I have heard of diamonds in the rough, Diamond Dick, baseball diamonds, diamond lumber, a suit in cards, diamond cut diamond, diamond drills, diamond-back rattle snakes, diamond anniversary, diamond crossing and diamond hitches, but this is the first time I heard of 'em by the acre. Seems to me these diamond hunting fellas in South Africa have dug more sand and clay to recover, say a bucketfull of diamonds, than Gen. Goethals and his merry men moved in the construction of the Panama Canal. Who was this here now Bro. Conway, and where did he find the glittering baubles by the acre? Or was he just talking at random like a sailor on leave promising a diamond ring to the first little silly Millie who dances with him?"

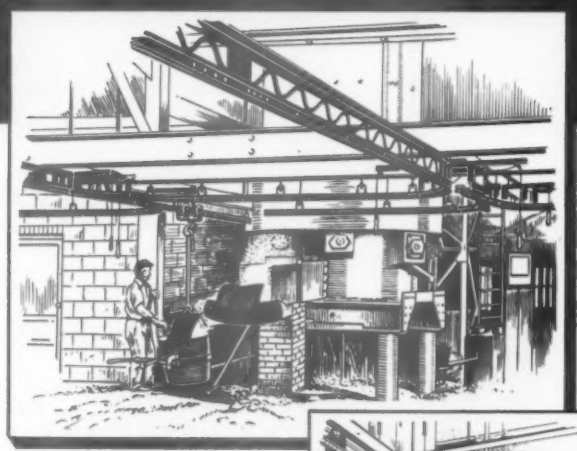
"After delivering the lecture approximately 6000 times to highly appreciative audiences all over the country, the author issued it in book form. The book has enjoyed wide popularity and has been employed freely as a stepping stone by lads and lassies, embryo orators, in their first attempts to appear before, and charm the public."

"Sweet mother in heaven," Bill said, lifting his hands and eyes in pious supplication. "Now he wants to sell me a book!"

"Why Willie!" I said. "How can you say such a cruel thing. I know you already have a book—or is it a mail order catalog?—and if you had another, your wife would insist on buying a pair of book ends, unless you smuggle home a couple of hunks of pig iron. As your old uncle Malachi says: I don't wish you any har-r-r-m, but I hope one of 'em falls

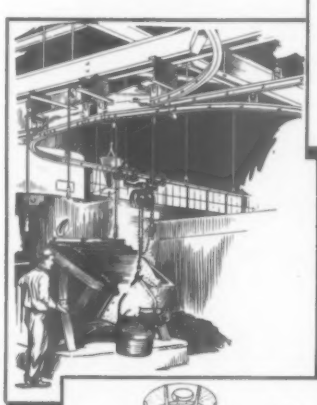
(*Concluded on page* 128)

Where AMERICAN MONORAIL *Helps* and *Saves* in the Foundry



▲ Overhead Loop for Quick Pouring

Overhead Control of Stoker Charge ▶



◀ Overhead Handling for Better Tapping

Overhead Handling for Cupola Charger ▼

- American MonoRail Overhead Systems have proven successful in low cost handling and providing more efficient handling methods in all foundry practices. From cupola charging to loading of finished products, regardless of the size or type of applications, American MonoRail can help.

- Any MonoRail installation will speed up production, lower costs, reduce accidents, reduce fatigue and release skilled hands for more profitable use.

- Let an American MonoRail Engineer show you how you can save time and money in your foundry operations. Write today!

SEND FOR BULLETIN C-1.
A 56 page book showing successful applications of American MonoRail Systems.

THE AMERICAN MONORAIL CO.

13104 Athens Avenue ★ Cleveland 7, Ohio

INTERNATIONAL MOLDING MACHINES

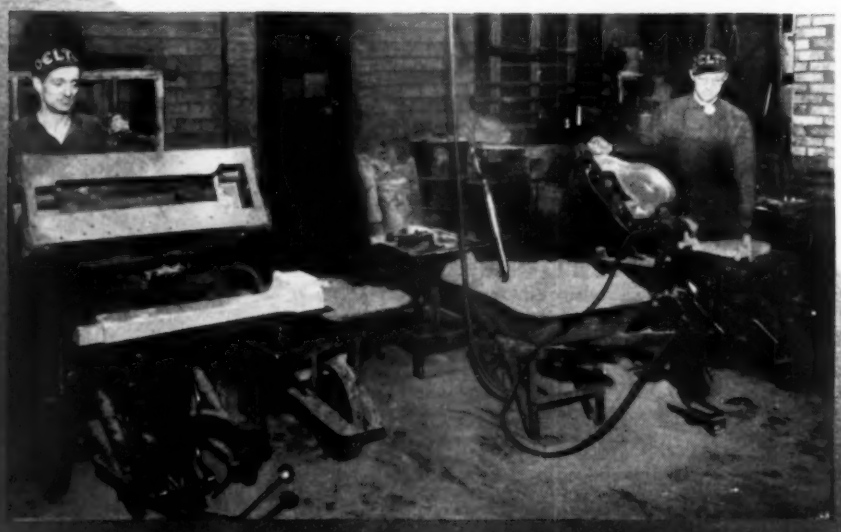
are busy in foundries all over the United States performing their vital part in the war program. Where High Production is important, Foundrymen specify

INTERNATIONALS

International Molding Machine Company **Chicago 8, Illinois**

If you have a foundry problem . . . call our Service Engineer
He knows the answers from practical foundry experience

Photographs taken at J. E. Gilson Company, Port Washington, Wisconsin



(*Concluded from page* 124)

on yer big toe, while you are paddling around in yer bare yella feet.' Listen.

"At great length and in a very interesting manner, the author develops the theme that people constantly overlook opportunities near home, literally acres of diamonds in the back yard, while they travel far and wide and in many instances suffer hardships and privations in a vain search for riches. That was all I had in mind when you referred so casually to picking up the tools and the bundle of old clothes. I suppose you had the old iron kelly firmly clamped on the head. If you had read *Acres of Diamonds,* you might have stayed at home, dug diligently in the garden or the back yard and eventually have married the old man's daughter and become president of the company."

"This thing seems to call for a new deal all around. The old man had three sons, ready and willing to take over and cut into the dividend checks. He had no daughter. Even if he had, I had as much chance of a hookup, as I would have in getting a two-bit raise over the rigid prevailing daily wage. If I had stayed at home, I would have shoveled an average of 10 tons of sand every day for 40 years and then would have been promoted to the position of assistant foreman in the dog house. The prospect did not appeal to me.

"I have not dug up many diamonds, but in the intervening years the hegira has taken me over a considerable part of this North American continent, from Sydney on the east, where it is claimed they raise the sun with a crowbar in the morning, on the comparatively few occasions the sun is willing to be raised, to the Golden Gate on the west and from the Great Lakes on the north to the Gulf of Mexico on the south. I have formed friendships with men with whom I have been fortunate enough to be associated in the shop, in the office and in local and national associations. As Tiny Tim said on a certain memorable occasion: 'God bless 'em, every one!' they are all members of the Ancient and Immortal Order of Stout Fellas. You may claim that is not a very tangible form of wealth. It would not do you much good in a hock shop or in a bank if you wanted to raise the wind, but I figure it is just as valuable to me—perhaps more valuable—than a handful of diamonds or other so called precious stones locked up in a safety deposit box, and never seen until the heirs start fighting over them after the original owner has been nipped and put away by the old gent with the beard and the hour glass.

"The instinct or nose for news is just as sharp in the small town editor, as it is in the big town contemporaries. Recently during my first day in the old home town I was interviewed by the portly editor of the local newspaper. With that peculiar and pawky humor characteristic of members, of the Fourth Estate the world over, he suggested that an appropriate head for the story he proposed to write might be, *The Return of The Prodigal,* or alternatively *Lassie*—or *Laddie—Came Home.* He rather favored the second title since it indicated his familiarity with current events and all that sort of thing as portrayed on the silver screen. He thought the title would hook up very nicely with a story showing how the hero after innumerable hardships and privations finally had returned to the scenes of his early youth. At this point he made a note to lift some of Paul's observations in one of his letters to the Corinthians about all the perils he had been through. He thought he could kind of splice or weld that into the story some place. Do you know anything about that?"

"Kind of far fetched, if you ask me," I said. "He was referring to Paul's Second Epistle to the Corinthians 11-16. Every person, even newspaper men know that. Push on, man, push on. I suppose you have a clipping in your pocket to prove that he actually wrote the story."

"He wrote and published the story on the front page. 'Twas a pretty good story, but in deference to my more or less violent protest he ditched the Prodigal and Lassie and used a mild and conventional head. I told him I did not like either of the titles and—as Chic Sale's hero says in the famous American classic on outdoor architecture published several years ago and snapped up by grinning millions without a word of advertising—'I'll tell you why.'

"As a matter of fact I'm allergic to dogs, and particularly to dog references, ancestors and descendants. In the foundry industry and quite probably in other less worthy places of endeavor, any reference to canine maternal relationship, whether in a calm, or in a highly emotional manner, never is regarded as either accidental or complimentary.

"I never liked the story of the Prodigal Son. I have read it and have heard it expounded many times, but I never have heard it expounded by any preacher in the manner it deserves. Invariably we are asked to sympathize with and admire an ungrateful young cub who left the peace and shelter and comfort of his father's house to spend his substance and several years of his life in the boozing kens, gambling joints and red light district of the great city. Finally when he was down and out, literally and figuratively, toes out of his shoes, needing a haircut and a shave and with portions of his anatomy showing through his air conditioned pants, he came creeping back to his father's house, looking like something the cat dragged in from the garbage can, and probably smelling just as bad.

"The back o' me hand, an' the sole iv me fut to that lad. I told the newspaper fella I had been standing on my own feet since I was 13 years old and I did not relish any association with the Prodigal Son, even remotely or by inference."

Moves Headquarters

American Standards Association has moved its headquarters from 29 West Thirty-Ninth Street, New York, to larger offices at Grand Central Terminal Office Building, 70 East Forty-Fifth Street, that city.

I'LL WRITE THA STORY
?
?
?

Until you have tried *Rapidry* Core Oil, you will never know how much better cores can be made with core oil that actually costs less

Foundries in all parts of the country who are now continuously using Certified *Rapidry* Core Oil were at first rather skeptical because of its very low price per gallon, but as one superintendent stated: "The very low price of *Rapidry* Core Oil made us hesitate to try it out but after many months of continuous use, we find it even better than you claim."

Certified *Rapidry* Core Oil not only costs substantially less than conventional core oils and provides uniform dependable cores for exacting requirements, it also enables many additional savings to be made.

Mixes quickly, evenly and thoroughly with the sand; works smoothly in the core boxes and does not crust excessively when mixed with sand and left lying on the benches during hot weather.

Bakes out quicker in the oven at usual temperatures or may be baked out at lower temperatures.

Saves time in the shake-out, as a result of readily collapsible cores.

Produces a minimum amount of smoke and gas in either the core room or during pouring.

Certified *Rapidry* Core Oil is positively guaranteed to run as uniform in quality as the most expensive core oil on the market.

There is a grade of Certified *Rapidry* Core Oil to use identically the same in the sand as any other conventional core oil regardless of the type of sand or other materials used in core mixtures.

DON'T DOUBT—
TEST AT OUR RISK—
SEND FOR
DETAILS!

CERTIFIED
Rapidry
TRADE MARK
CORE OIL

RESISTS OVERBAKE | INCREASES OVEN PRODUCTION | LOWERS GAS CONTENT

CERTIFIED CORE OIL & MFG. CO.

"The House of Dependability"

3308-26 South Cicero Avenue, Cicero, Illinois

Stock and Representatives: Buffalo, N.Y. Elmira, N.Y. Worcester, Mass. Reading, Pa. Newark, N. J. St. Louis, Mo. Milwaukee, Wisc. New Orleans, La. Houston, Tex. Chattanooga, Tenn. Minneapolis, Minn. Portland, Ore.

Only BLACK HILLS BENTONITE

Gives this 4-WAY Superiority

1 HIGHEST DRY STRENGTH.

2 HIGHEST HOT STRENGTH.

3 HIGHEST RESILIENCE.

4 HIGHEST in combination of high green permeability with high dry and high hot strength.

ALSO: Black Hills gives very high green strength and very high green permeability.

You know, Mr. Foundryman, what properties these characteristics impart to a casting. If they are what you want, choose Black Hills Bentonite. You will find it not only extremely strong, but uniform and reliable in every respect. Not one carload has ever been rejected.

BUT — no one bonding clay can do all foundry jobs equally well. If you require different characteristics, let ECP engineers analyze and recommend, drawing upon five products in all (see list below) and their many "in-between" combinations. No cost — no obligation.

Five bond clays — five bulletins — which may we send you?

EASTERN CLAY PRODUCTS, INC., EIFORT, OHIO

ECP

DIXIE BOND · BLACK HILLS BENTONITE · REVIVO BOND · REVIVO SUPER BOND · BALANCED REVIVO

All TYPES OF BONDING CLAYS

A Foundry Sand Service Based Upon Practical Research

HOW MUCH IS THE JOB WORTH?

By EUGENE J. BENGE
President
Benge Associates, Chicago

ONE question before executives, production managers, foremen, union representatives and arbiters more often than any other is "What is the job really worth?" This is a question which cannot be evaded. How well this question is answered is reflected in employe morale, production records, profit and loss statements and in all relationships between employer and employe. Pay rates are the very heart of employe-employer relationships.

Once upon a time somebody or other in the management branch of a firm scratched his head for a moment, looked at the ceiling, and announced, "Oh, I guess that job's worth about 90 cents an hour. It takes a pretty good man." Sometime later when faced with making a similar decision he went through the same act and announced that this particular job was worth about 80 cents per hour.

Had he taken the time to analyze each of the jobs, he might have found that the second came nearer to being a 90-cent job than the first and that the first job, by comparison, would have been adequately compensated at a rate of 75 cents.

Why should one job pay 90 cents an

(*Continued on page* 168)

	MENTAL	SKILL	PHYSICAL	RESPONSIBILITY	WORK COND.
44					
43		Pattern Maker			
42					
41					
40					
39	Pattern Maker				
38					
37					
36					
35		Cupola Tender			
34					
33				Pattern Maker	
32		Floor Molder			
31					
30	Cupola Tender				
29					
28		Machine Molder	Pot Pusher	Cupola Tender	
27	Floor Molder				
26		Core Maker	Sand Blaster		
25		Core Setter	Floor Moulder		
24			Cupola Tender		
23	Machine Molder	Flask Repairman			
22			Machine Molder		
21	Core Maker		Core Setter		
20	Core Setter		Core Maker	Floor Molder	Pot Pusher
19	Flask Repairman		Sand Mixer		Sand Blaster
18			Flask Repairman	Core Setter	
17				Machine Molder	Cupola Tender
16			Pattern Maker	Sand Mixer	Machine molder
15		Sand Mixer		Core Maker	Floor Molder
14	Sand Mixer	Sand Blaster			Core Setter
13				Flask Repairman	Core Maker
12	Sand Blaster				Sand Mixer
11				Sand Blaster	
10					Flask Repairman
9					Pattern Maker
8		Pot Pusher			
7	Pot Pusher			Pot Pusher	
6					
5					
4					
3					
2					
1					

Fig. 1 (below)—Front and back of job analysis specification sheet. Fig. 2 (above)—Key comparison scale

SYMBOLS
Use X to indicate; XX to stress; R for required; P for preferred; or show percentage or amount.

JOB SPECIFICATION CO.

Job Title: Alternate Title:
Department:
Name of Employee:
Years of Service: Time on this job Superior
Duties:

Occasional Duties:

MENTAL REQUIREMENTS

Education:
Special Knowledge:
Mathematics Used:
Follows procedures of Mathematical Analysis:
Reads Orders: Reads Blue Prints:
Prepares Records:
Job Instruction:
Personal Qualities:
Monotony: Distractions:
Inventive ability - Ingenuity:
Mental approach:

SKILL

Kind:
Work Knowledge:
Time to Learn Basic: Acceptable Proficiency Time:
Desirable Prior Experience:
Dexterity: Operation: Good Handwriting:
Sensory Training: Color Discrimination:

PHYSICAL FACTORS

Kind
Age Limits: Sex: Best Periods:
Activity:
Type: Illumination:
Surroundings: Atmosphere:
Hazards:
Other

RESPONSIBILITIES

Kind of Equipment:
Materials:
Records: Methods:
Savings: How Money:
Confidential Matters: For Employee Contact:
For Public Contact:
Other:

SUPERVISION

Gives none, receives much: Gives none, receives little:
Gives much, receives much: Gives much, receives little:
Directs Employees, type Plans for others, how:
Instructs, how: Approves, what:
Highest Job Supervised: Other supervision:

Prepared by: Approved by: Date:

activities of foundry GROUPS

Chicago

PRESSURE for production of castings for war notwithstanding, the annual stag outing of the Chicago Chapter of the A.F.A., on Aug. 19 did not suffer from manpower shortage. As a matter of fact, foundrymen and their guests to a total of 1090 broke away from furnaces and molds to make their way to the swanky Lincolnshire Country club, south of Chicago, to establish a new all-time attendance record by a narrow margin. Previous top had been 1037 in 1941.

An ideal day with temperature in the upper 70's sustained the sound judgment of the chapter's officers and outing committee who starting with last year moved the event forward from unpredictable late September to mid-August. This year, as last, there was generous participation in the golf competition and horseshoe pitching contest for numerous and attractive prizes. For the non-athletic, there were several county fair carnival attractions. And for all, sampling of Pabst and Schlitz "on the house" proved a pleasant pastime.

At 7 p.m., the Big Tent bulged with hungry diners indulging in the customary fried chicken with all the trimmings. When the noise and din of chicken bones and coffee cups had subsided sufficiently that the microphone amplifier could be heard, the committee proceeded with the prize awards to golfers and horseshoe pitchers, and drawing of a goodly number of War Bond door prizes. Ten acts of floor show completed the festivities.

Credit for a successful outing went to a 36-man entertainment committee headed by D. A. Farrell, as chairman and H. E. Cullen as secretary, the former being foundry superintendent, and the latter director of recreation, respectively, Carnegie-Illinois Steel Corp., South Works.—*Erle F. Ross.*

Northern California

NORTHERN California Chapter of the A.F.A. held its first meeting of the 1944-45 season Sept. 1 at the Engineer's Club, San Francisco, one week in advance of the usual date.

Ralph C. Noah was in charge for the time as president and was well supported by his officers and directors. The more personal introduction by each of the 101 persons present was well worth the little extra time taken. Attendance included 84 members and 17 guests.

Mr. Noah gave a short report on his attendance at the chapter presidents' conference held in Chicago Aug. 26, briefly covered local items of interest, and called on Harold Henderson, chairman of the sand committee, to outline future plans, and on our national director, S. D. Russell, for comment on the association's activities and the part he played as chairman of the chapter's apprentice training committee. Joe Melling, H. C. Macaulay Foundry Co., who is instructor for the apprentice committee, took over where Mr. Russell left off and seemingly convinced the group that one of the most important jobs ahead for foundrymen is that of apprentice training.

Donald L. Mason, program chairman, introduced our own member, David B. Reeder, Electro Metallurgical Sales Corp., whose scheduled talk was on "The Melting and Treatment of Cast Iron." Mr. Reeder first sketched the outlines of a cupola on a blackboard and then proceeded to detail its operation from the bed right through to "dropping the bottom."

Those experienced in cupola operation probably were double checking the speaker for errors or omissions as well as to gain something from his technic, while the listeners who were unfamiliar with the subject had an exceptional opportunity to absorb expert information.—*Richard Vosbrink, publicity chairman*

Birmingham

ELEVENTH annual outing of the Birmingham Chapter of the A.F.A., held Sept. 9 at the Roebuck Country Club, attracted approximately 500 members and guests. An extensive program of sports included swimming, golf, horseshoe pitching and soft ball.

L. S. Moncrief, J. G. Hodges and Vic M. Randolph were the high scorers in the horseshoe pitching contest, and Capt. Harry Mouat's Supplymen's Giants won the ball game. Prizes of war bonds and stamps were awarded the individuals in each of these contests. Members of the winning ball team were: Horace Camp, Harry Mouat, Alex Murdock, Fred Barbour, C. M. Strickland, E. C. Garrett, R. A. Loys, Arthur Watkins, Tom Benners, F. H. Springer and A. G. Messer. A fine dinner of barbecued pork and beef was served at 7 p.m., after which a drawing for a half-dozen miscellaneous prizes was held.

(*Continued on page* 134)

CHICAGO FOUNDRYMEN: Record attendance marked the Aug. 19 stag outing and golf party of the Chicago Chapter, A.F.A., at Lincolnshire Country Club. Shown above is the Big Tent provided for the dinner and floor show

TOUCHDOWN!

Winning touchdowns come from tightly-knit team play—eleven men all working toward one goal—that's teamwork. Back of profitable casting production is more teamwork — good men using good methods working with good materials.

MOGUL CEREAL BINDER . . . *saves binder costs;* reduces baking time and cleaning costs; increases oven capacity and core production . . . PRODUCES QUALITY CASTINGS.

MOGUL is a perfect Green Bond, which increases permeability in cores and bonds. MOGUL can be used in cores when both green and dry strengths are required.

MOGUL works with core oil, because it decreases drying time, and produces smooth cores. MOGUL works perfectly with pitch or resin, too, because cores can be handled while still warm. MOGUL is widely used with sharp sand.

Team up with MOGUL and KORDEK — you can depend on them.

KORDEK

Kordek is a perfect DRY BOND. Kordek can be used in smaller proportions than most dry binders. Produces better castings with fewer discards.

CORN PRODUCTS SALES CO. **17 BATTERY PLACE NEW YORK 4, N. Y.**

(*Continued from page* 132)

Tom Benners, Woodward Iron Co., was chairman of the entertainment committee; Gale Irvin, Republic Steel Corp., handled the ticket distribution, while athletic activities were in charge of Harry Mouat, Whiting Corp., and Gene Whelchel, American Cast Iron Pipe Co. Lynn G. Ogden, American Casting Co., was sergeant-at-arms and did a fine job in seeing that all present had a good time.—*H. B. McLaurine.*

Northeastern Ohio

NORTHEASTERN Ohio Chapter of the A.F.A. got off to a flying start with its opening meeting held at the Cleveland Club on Sept. 14. Approximately 100 members and guests were present. President Russell F. Lincoln presided, and, in welcoming those present, he pointed out that the coming year will be an important one. He said that the foundry industry has been little understood as evidenced by unfavorable publicity, and urged every foundryman to participate in an organized effort to spread the true facts.

Mr. Lincoln also said that in order for the chapter to provide the utmost in real and effective help in the future reconversion program, every member must be active. Following an introduction of the new officers of the chapter, Mr. Lincoln called on Jack Hornug to take a bow in recognition of his retirement from the industry after 61 years of service with Ohio Foundry Co.

Main speaker of the evening was James L. Bates, director of technical division, U. S. Maritime Commission, Washington, who described some of the activity of that organization in providing shipping capacity. Under its supervision over 38,000,000 tons of deadweight ships was built in less than 3 years. This comprised 3751 ships of various types, including 2316 Liberty type. These vessels carried 62,000,000 tons of goods of which nearly 25 per cent was petroleum products.

The evening's program was concluded with the showing of a motion picture produced for General Motors Corp. and depicting the role of American industry in the war.—*Edwin Bremer, publicity committee.*

Southern California

SEVENTH annual summer stag of the Southern California Chapter of the A.F.A. was held Aug. 5, at Lakewood Country Club, Long Beach, Calif.

More than 500 members and guests were in attendance to participate in the afternoon and evening program of golf, horse-shoe pitching, tug-of-war, races, and baseball; and to enjoy the dinner and entertainment which followed. The entertainment committee, which did such a fine job, was headed by Chairman Bill Emmett of Los Angeles Steel Casting Co.

The affair was greatly enjoyed by all who attended, and everyone is looking forward to the next big event which will be the foundrymen's annual Christmas party.

During the dinner, it was announced that the first meeting of the new year would be held at the Elks Club, Friday, Sept. 22.

The new officers of the Southern California Chapter are: President, W. D. Bailey, Jr., Westlectric Castings Co.; vice president, Milton Hagener, General Metals Co.; treasurer, Robert R. Haley of Advance Aluminum Foundry; secretary, Henry Russil, of Eld Metals.—*R. H. Hughes, publicity chairman.*

Western Michigan

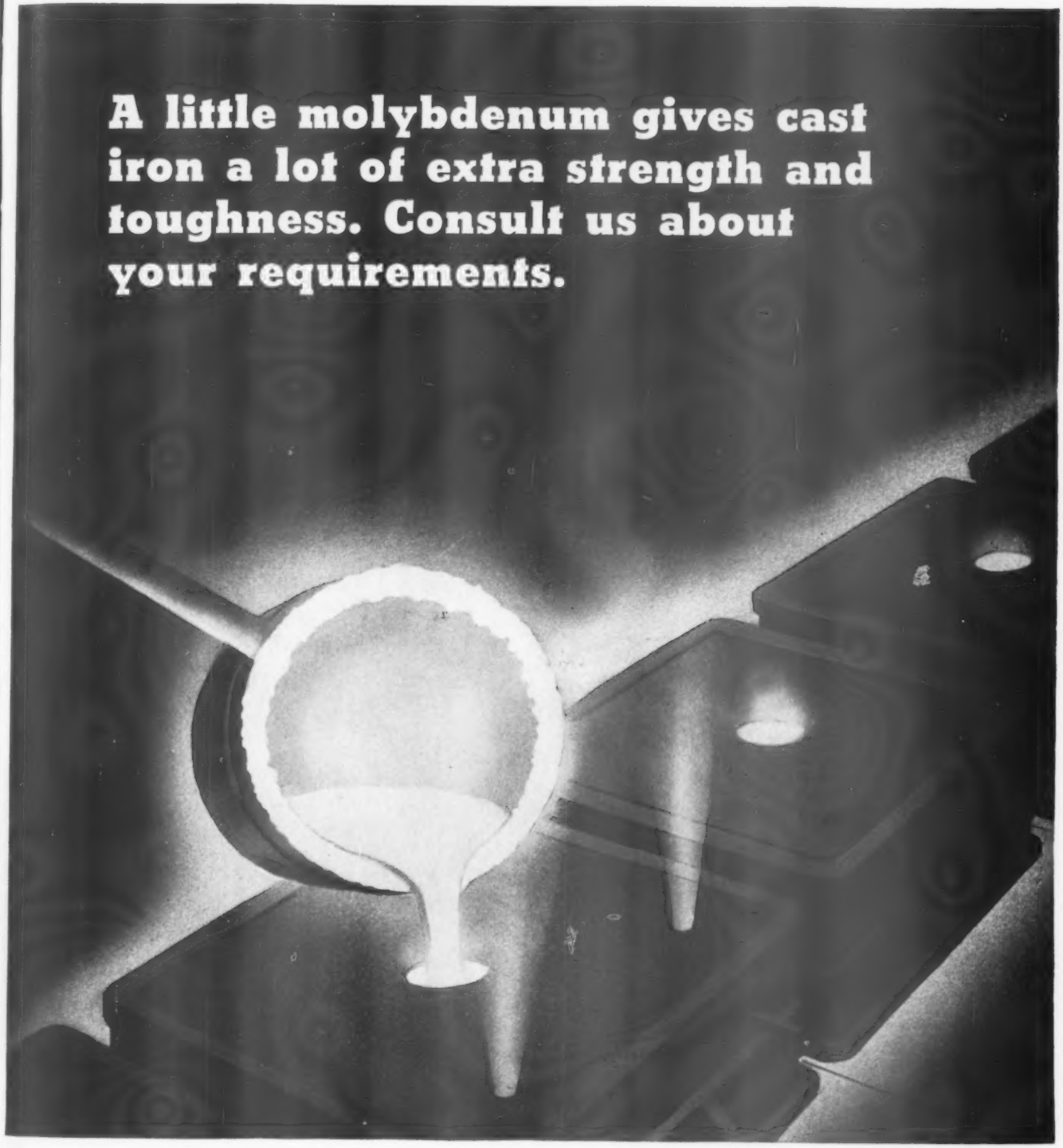
FOURTH annual picnic of the Western Michigan Chapter of the A.F.A., held Aug. 19 at the Spring Lake Country Club, Grand Haven, attracted a record turnout of 450 members and guests, 100 more than a year ago.

Golf, baseball, horseshoes and other games were enjoyed throughout the day, with boat rides on Spring Lake and into Lake Michigan provided for the less strenuous members. In the evening, an excellent chicken dinner followed by a floor show concluded the festivities.

The chapter's first regular dinner meeting for the 1944-45 season will be held Oct. 9 at the Hotel Wm. M. Ferry, Grand Haven.—*J. Wesley Lee, secretary.*

SOUTHERN CALIFORNIA STAG: These two views show only part of the approximately 500 *members and guests of the Southern California Chapter, A.F.A., who attended the seventh annual stag held at the Lakewood Country Club Aug.* 5

A little molybdenum gives cast iron a lot of extra strength and toughness. Consult us about your requirements.



CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.

ARMY E NAVY

MOLYBDIC OXIDE, BRIQUETTED OR CANNED • FERROMOLYBDENUM • "CALCIUM MOLYBDATE"

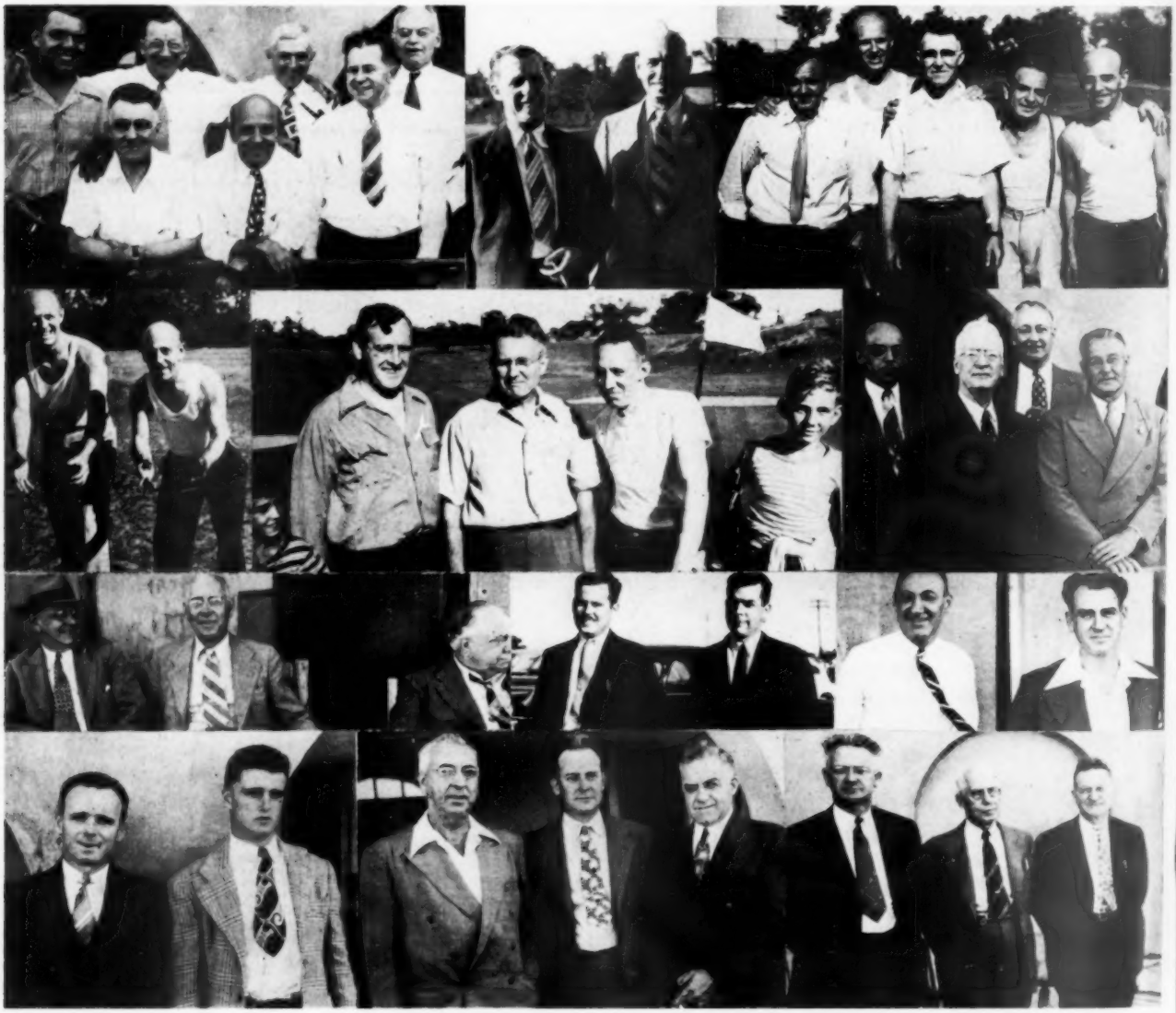
Climax Molybdenum Company

500 Fifth Avenue · New York City

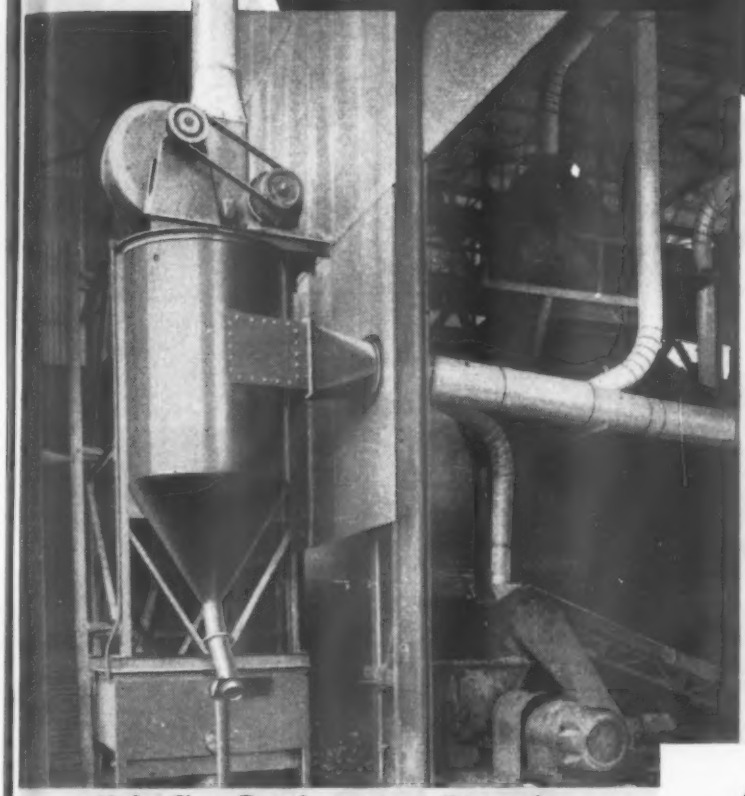
MOLY

WESTERN MICHIGAN PICNIC (Above): Scenes at the fourth annual picnic of the Western Michigan Chapter of the A.F.A. held Aug. 19 with a record attendance of 450 foundrymen, suppliers and guests. Photos courtesy of J. Wesley Lee, Challenge Machinery Co., Grand Haven, Mich.

NEW ENGLAND OUTING (Below): Some of the approximately 80 members and guests of the New England Foundrymen's Association who took part in the annual outing held Aug. 9 at the Pawtucket Golf Club. Photos courtesy of C. A. Wyatt, Debevoise-Anderson Co. Inc., Boston



How to Eliminate Foundry Dust and Increase Efficiency



Hydro-Clone Dust Suppressor collects and suppresses dust from shake-outs, screens, elevators, etc.

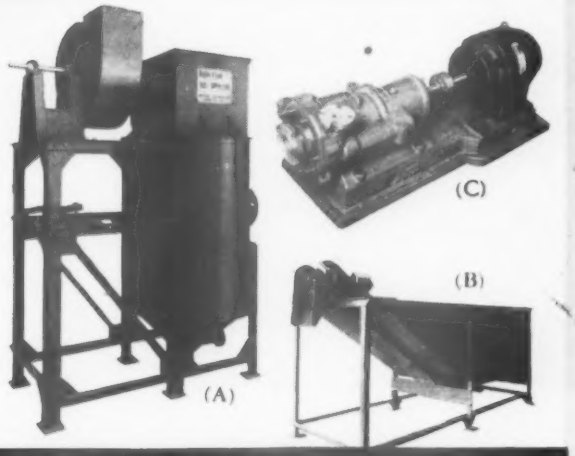
The clean, fume-free air resulting from use of the Whiting Hydro-Clone improves foundry working conditions ... contributes to the health and safety of workers ... pays dividends in increased efficiency.

Hydro-Clones are widely used in connection with sand-blasting equipment, tumbling mills, shake-outs, grinders, and other dust-raising operations. They completely suppress dust by wetting ... taking up to 99.6% of the dust out of foundry air.

The Hydro-Clones shown here represent only a few of the many types available. All are individually engineered to specific needs.

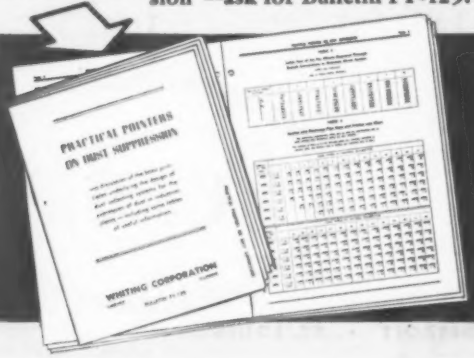
WHITING CORPORATION
15607 Lathrop Avenue Harvey, Illinois

Hydro-Clone Grinding Bench is safe for finishing aluminum and magnesium castings.



(A) Type "SH" Hydro-Clone.
(B) Sludge Tank with automatic sludge ejector.
(C) Hydro-Brasive Pump.

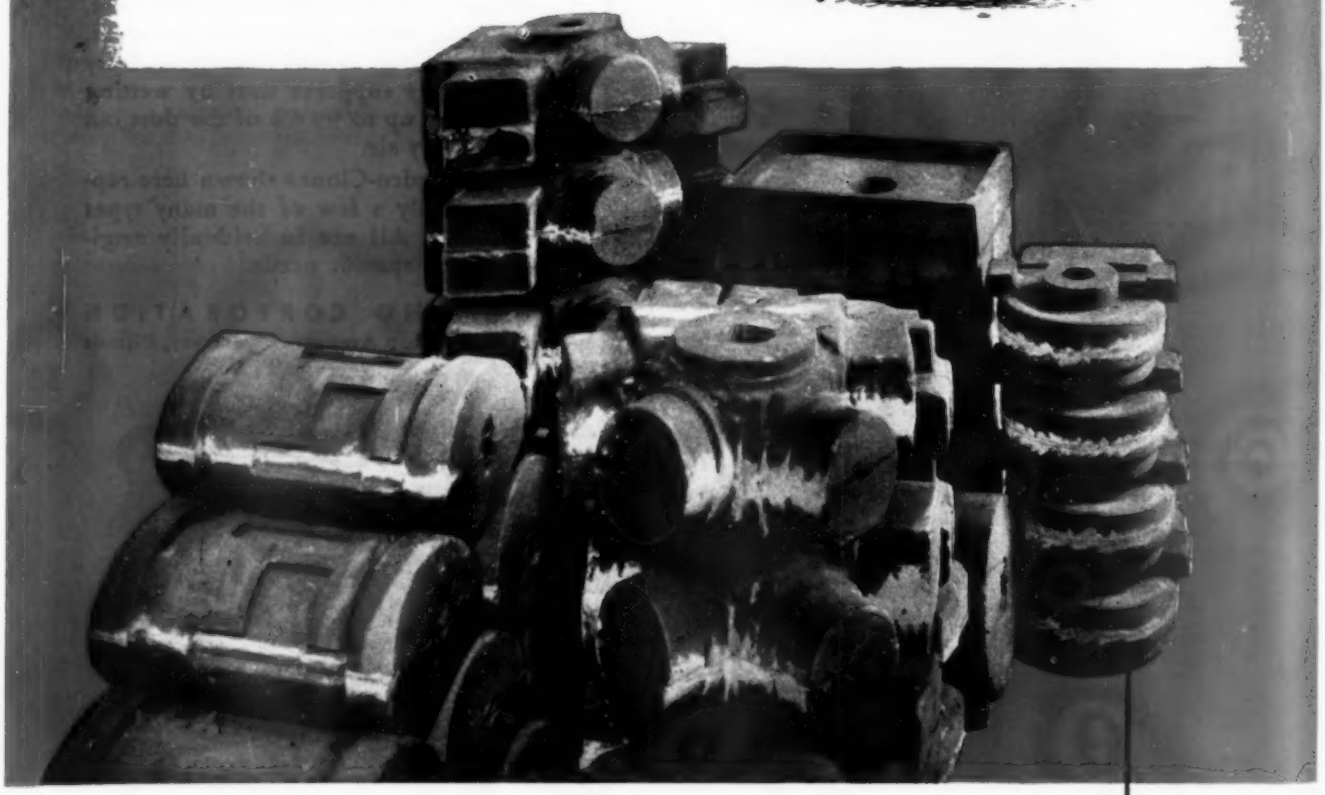
FREE BOOKLET "Practical Pointers on Dust Suppression"—ask for Bulletin FY-129.



WHITING
CORPORATION
HYDRO-CLONE DUST
SUPPRESSION EQUIPMENT

PENOLYN CORE OIL MEANS

HARD BINDING...



Cores and molds hold their shape with Penolyn Core Oil . . . and perfect molds mean more perfect castings each working day. In every way, Penolyn Core Oil is helping to boost the flood of castings needed in America's world-shaking war production—for it bakes fast, binds hard, holds gas-forming tendencies to a profit-saving rock-bottom.

No wonder so many of America's greatest foundry-men swear by Penolyn Core Oil. They know what it can do to make their job go easier, faster. Why not discuss your casting problems with Penola engineers? They're always on call.

Penola
Reg. U.S. Pat. Off.

PITTSBURGH, PA. • NEW YORK • CHICAGO • DETROIT • ST. LOUIS

Chapter Officers of A.F.A. Meet

Twenty-seven newly elected officers of chapters of the American Foundrymen's Association gathered in Chicago, Aug. 20, for the first annual Chapter Contact Conference of the society. The conference was called to establish closer

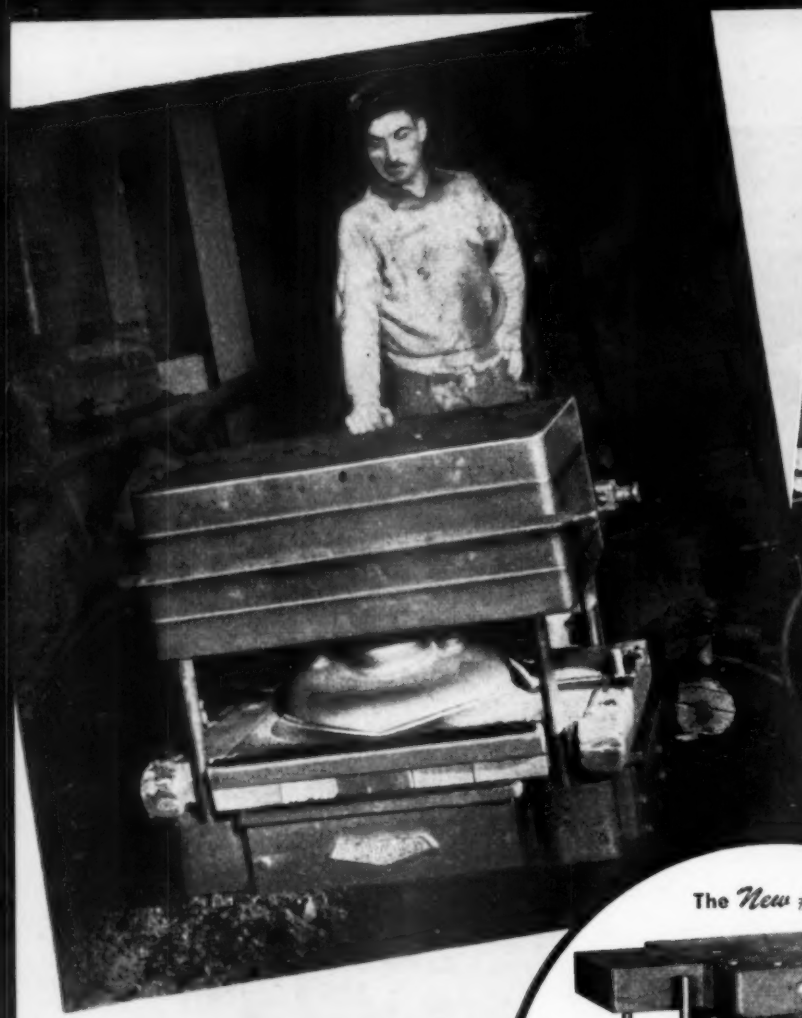
(*Concluded on page* 142)

(Center foreground) — National President Ralph J. Teetor, Cadillac Malleable Iron Co., Cadillac, Mich.; (right foreground) H. A. Horner, Frick Co., Waynesboro, Pa., chairman of Chesapeake Chapter; (right to left around table)—John M. Robb Jr., Hickman, Williams & Co., Philadelphia, vice-chairman of Philadelphia Chapter; N. F. Hindle, director, A.F.A. Technical Development Program; W. W. Maloney, A.F.A. business manager; F. G. Steinebach, editor, The Foundry, Cleveland; Conference Chairman I. R. Wagner, Electric Steel Castings Co., Indianapolis, national director of A.F.A.; Jennie Reininga, A.F.A. assistant treasurer and office manager; A. M. Fulton, Northern Malleable Iron Co., St. Paul, chairman of Twin City Chapter; H. E. Ladwig, Allis-Chalmers Mfg. Co., Milwaukee, president of Wisconsin Chapter.

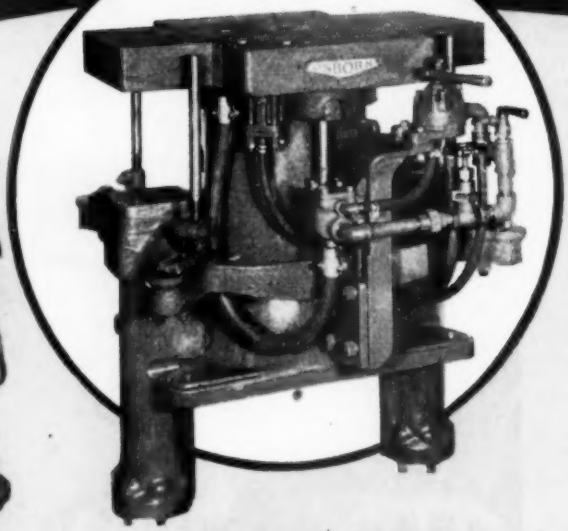
(Left foreground)—W. D. Bailey Jr., Westlectric Castings Inc., Los Angeles, president of Southern California Chapter; (left to right around table)—Dr. Ralph L. Lee, General Motors Corp., Detroit; R. G. McElwee, Vanadium Corp. of America, Detroit, chairman of Detroit Chapter; R. E. Wilke, Deere & Co., Moline, Ill., chairman of Quad City Chapter; H. B. Hanley, American Laundry Machinery Co., Rochester, N. Y., president of Rochester Chapter; National Vice-President Fred J. Walls, International Nickel Co., Detroit; F. G. Sefing, International Nickel Co., New York, representing Metropolitan Chapter; Leonard B. Larsen, staff assistant of A.F.A.; R. W. Mattison, Mattison Machine Works, Rockford, Ill., chairman of Northern Illinois and Southern Wisconsin Chapter; A. S. Klopf, Firegan Sales Co., Chicago, chairman of Chicago Chapter.

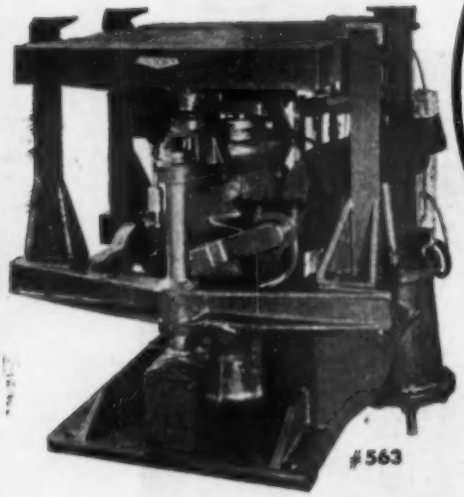
(Center foreground, at table)—Ralph J. Teetor; (left to right around table)—H. A. Horner, chairman of Chesapeake Chapter; G. Ewing Tait, Dominion Engineering Works, Lachine, Que., vice chairman of Eastern Canada and New Foundland Chapter; K. F. Schmidt, United Engineering & Foundry Co., Canton, O., chairman of Canton Chapter; R. T. Robertson, International Harvester Co. of Canada Ltd., Hamilton, Ont., chairman of Ontario Chapter; R. C. Noah, San Francisco Iron Foundry, San Francisco, chairman of Northern California Chapter; H. H. Lurie, Cummins Engine Co., Columbus, Ind., chairman of Central Indiana Chapter; E. E. Ballard, National Bearing Metals Co., St. Louis, chairman of St. Louis Chapter; A.F.A. Director S. V. Wood, Minneapolis Electric Steel Casting Co., Minneapolis; F. M. Wittlinger, Texas Electric Steel Castings Co., Houston, chairman of Texas Chapter.

(Foreground left to right)—R. W. Mattison; A. S. Klopf; W. D. Bailey Jr.; (center foreground, rear table)—A.F.A. Secretary R. E. Kennedy; (left to right around table)—A.F.A. Director W. B. Wallis, Pittsburgh Lectromelt Furnace Corp., Pittsburgh; W. A. Rengering, Cincinnati Milling Machine Co., Cincinnati, chairman of Cincinnati Chapter; R. F. Lincoln, R. F. Lincoln & Co., Cleveland, president of Northeastern Ohio Chapter; Leighton Long, Leighton M. Long & Associates, Toledo, O., chairman of Toledo Chapter; V. C. Bruce, Buckeye Products Co., Elkhart, Ind., chairman of Michiana Chapter; I. L. Brooks, Muskegon Piston Ring Co., Sparta, Mich., chairman of Western Michigan Chapter; R. D. Loesch, Lake Erie Foundry Co., Buffalo, chairman of Western New York Chapter; F. K. Brown, Adams, Rowe & Norman, Inc., Birmingham, Ala., secretary-treasurer of Birmingham Chapter; H. G. McMurry, Buick Motor Division, General Motors Corp., Flint, Mich., secretary of Saginaw Valley Section of Detroit Chapter.

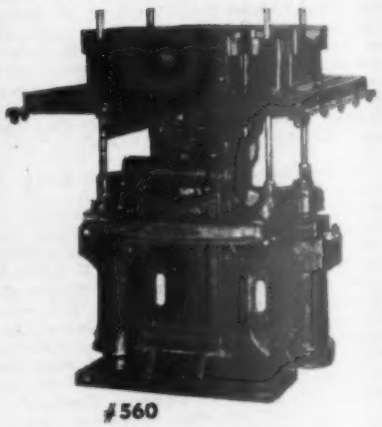


The *New* #539

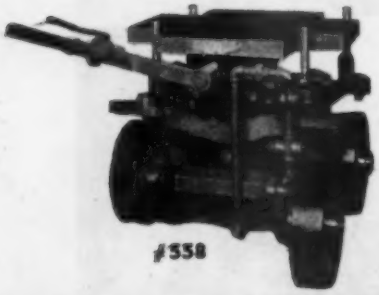




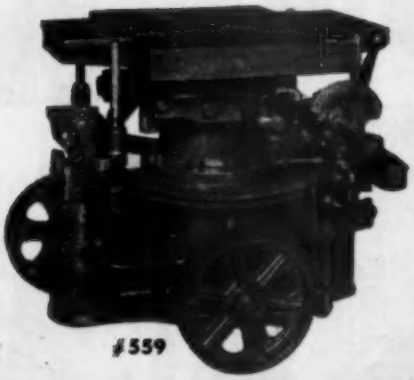
#563



#560



#558



#559

#559HD

HAVE YOU SEEN OSBORN'S

New JOLT STRIP MOULDING MACHINE?

THE No. 539 is the newest addition to one of the most complete lines of jolt strip machines featured by any manufacturer of foundry equipment.

This newly designed machine has a 12″ hydraulic draw . . . and the upward travel of the stripping mechanism can be stopped at any point in the draw stroke.

It provides a full 12″ deep draw without the necessity of setting the base of the machine below the floor line, except to provide clearance for draw cylinders. Working height provides maximum ease of operation—hence you get faster, more efficient production.

In addition, the No. 539 has these features common to the entire line:

Greater Flexibility — due to adjustable lifting pins . . .

Solid hard-ramming jolt blow . . .

Rugged design — can be used in jobbing or production foundries . . .

Accommodates a wide range of flask sizes within the capacity of the machine . . .

Ease of adjustment to any desired flask size; adaptable to various types of flasks.

THE OSBORN MANUFACTURING COMPANY

5401 Hamilton Avenue ★ *Cleveland, Ohio*

OSBORN

MOULDING MACHINES

(*Concluded from page* 139)

relations between the national organization and the local groups, and to coordinate the efforts of both in carrying on activities of importance to the foundry industry.

In addition to chapter officers, the following also attended: A.F.A. President R. J. Teetor, Cadillac Malleable Iron Co., Cadillac, Mich.; A.F.A. Vice President F. J. Walls, International Nickel Co., Detroit; A.F.A. Directors W. B. Wallis, Pittsburgh Lectromelt Furnace Corp., Pittsburgh, Pa., and S. V. Wood, Minneapolis Electric Steel Castings Co., Minneapolis; Dr. Ralph L. Lee, General Motors Corp., Detroit; F. G. Sefing, International Nickel Co., New York; F. G. Steinebach, editor of THE FOUNDRY, Cleveland. A.F.A. Director I. R. Wagner, Electric Steel Castings Co., Indianapolis, Ind., presided as chairman of the conference.

One of the major subjects discussed involved methods of interesting the students of engineering schools and colleges, trade schools and high schools to take up foundry work as a career. Chapter officers were urged to give the question of its future supply of manpower more thought, even to the extent of creating interest in boys prior to their entering the high schools.

F. G. Sefing described briefly some of the work of the association's Committee on Co-operation with Engineering Schools and Colleges, and presented some suggestions offered by school faculties on furthering the interest of their students in the foundry field. These suggestions included: Visits by foundrymen to the schools, lectures by prominent foundrymen before graduating classes, consulting with the faculties for betterment of foundry courses, offering scholarships at engineering schools, turning over foundry research projects to the schools for study, and contacting graduating engineers for the purpose of offering them foundry employment.

The importance of apprentice training to the industry was emphasized, and the work of the association in this respect described by Secretary Kennedy. F. J. Walls reported on formation of a new committee on youth encouragement, whose purpose will be the interesting of foundrymen in encouraging boys of grade school age in the casting of metals.

Officers of Foundry Groups

The following list completes the tabulation of officials of various foundry associations and A.F.A. chapters. Names of officials of other groups were published in the September issue.

READING FOUNDRYMEN'S ASSOCIATION

President—Hermann P. Good, Textile Machine Works, Reading, Pa.

Vice President—C. C. Mundell, Fairmount Foundry Inc., Hamburg, Pa.

Treasurer—G. W. Shomo, Confer, Smith & Co. Inc., Hamburg, Pa.

Secretary—H. C. Cummings, Berks County Trust Bldg., Reading, Pa.

Executive Committee: E. J. Snell, Keystone Foundry Co., Lebanon, Pa.; B. W. Edris, Berks Foundry & Mfg. Co., Hamburg, Pa.; Wm. M. Davies, Reading Foundry & Supply Co., Reading, Pa.; C. H. Meminger, Lancaster Iron Works, Lancaster, Pa.; D. G. Burkert, Eastern Foundry Co., Boyertown, Pa.; Wm. Hoffman, Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.; E. K. Mark, Penn Foundry Co., Reading, Pa.; R. P. Fritch, Union Bronze Co., Reading, Pa.

CONNECTICUT NON-FERROUS FOUNDRYMEN'S ASSOCIATION

President—Walter J. Kenney, North & Judd Mfg. Co., New Britain, Conn.

Vice-President—S. W. Chappell, Electric Boat Co., Groton, Conn.

Treasurer—Joseph Shannon, Jenkins Bros. Co., Bridgeport, Conn.

Secretary—Louis G. Tarantino, Niagara Falls Smelting & Refining Corp., Buffalo, N. Y.

Technical Secretary—Frank B. Diana, The Whipple & Choate Co., Bridgeport, Conn.

Executive Committee — Chairman, Ernest Stone, Manning, Maxwell & Moore, Bridgeport, Conn.; D. Wesley Case, Belknap Mfg. Co., Bridgeport, Conn.; H. A. Phelps, Phelps Foundry Co., Ansonia, Conn.; T. Joseph Judge, Jenkins Bros. Co., Bridgeport, Conn.; George S. King, Malleable Iron Fittings Co., Branford, Conn.

Book Review

Manufacture and Fabrication of Steel, by Ernest J. Teichert, Supervisor of Metallurgy Extension, Pennsylvania State College; fabricoid; 487 pages, published by McGraw-Hill Book Co. Inc., New York and London. Price $4.00.

This is the second of a three volume series originally designed to be used in connection with a training program for persons interested in the iron and steel industry. The text covers all the common methods of manufacture and processing steel, including primary fabrication, and is presented in a clear and concise manner.

Following an introductory chapter, the material is presented under 18 chapter headings: Bessemer process; basic open heart process; acid open hearth process; electric furnace process; special steel making process; the steel ingot; fabrication of steel; general methods of fabrication; general factors affecting rolling operations; rolling mill practice; manufacture of steel strip, sheet and coated products; manufacture of steel wire; general welding methods; manufacture of tubular products; forging practice; the steel foundry; specifications, suggested reading and index. The ten pages of chapter 17 on the steel foundry present an interesting example of condensed accuracy.

Cumulative Index for Chemical Formulary, by H. Bennett, cloth, 164 pages, 5½ x 8½ inches, published by Chemical Publishing Co. Inc., Brooklyn, N. Y. Price $4.

While each of the six volumes of the *Chemical Formulary*, reviewed in these columns from time to time, has its own index, the present *Cumulative Index* eliminates the necessity of searching through the indexes of various volumes to locate a specific item.

X-RAY PROGRESS: Wartime research applied to x-ray units for industrial applications has brought about a streamlining in design and technical improvement illustrated graphically in the photographs showing the progress made in a decade.

At the top is an "antique" version of an industrial x-ray unit built by the Kelley-Koett Mfg. Co., Covington, Ky., in 1934. *Cabin and table are shown mounted on a Ford truck.*

Today's production pattern is illustrated in the bottom photograph showing the modern Kelley-Koett radiographic cabinet. The 1944 *unit shown in contrast to the early effort is one of a wide variety of designs based on functional demands.*

Complicated Castings

...CLEAN AS A WHISTLE

TODAY, thanks to Truline Binder, shops and plants all over the country are turning out complicated castings with the greatest of ease. They're coming off the line—*clean as a whistle*—right on time!

For Truline with its superior workability helps skilled operators make cores quickly to amazingly close limits. Take the body of an oil-line valve. Look at the seat and the clean interior. Truline Binder shines on jobs like this!

In addition, Truline-bonded cores break away clean—collapse readily, thus preventing "hot-tears."

Consider Truline for your tough jobs—for any job, in fact, where you want to save time and money. The coupon at the right is for your convenience.

Save time these 3 ways...

1 GET FASTER FORMING!

Truline cores ram quickly, giving dense cores with freedom from sagging. *This means more cores per hour per core maker!*

2 GET FASTER BAKING!

Truline cores harden under low oven heat, dry without oxidation. Oven-time is less, output greater!

3 GET FASTER CLEANING!

Truline cores burn out readily. Core sand shakes out easily, saving valuable clean-up time.

TRULINE BINDER

Reg. U. S. Pat. Off.

HERCULES POWDER COMPANY
INCORPORATED
999 Market St., Wilmington 99, Delaware

Please send ☐ sample ☐ information on how to use Truline Binder in casting:

(state type of work and kind of metal cast)

Name _____ Title _____

Company _____ City _____ State _____ SB-44

Address _____

INDUSTRY

UNITED States Maritime Commission recently granted renewal awards to 46 manufacturing companies now flying the Maritime "M" for continued achievement in production for the Victory Fleet. Among the companies awarded their first gold stars were Kennedy Valve Mfg. Co., Elmira, N. Y., and National Radiator Co., Johnstown, Pa. Companies receiving their third gold stars included Buckeye Iron & Brass Works, Dayton, O.; Fort Pitt Steel Casting Co., McKeesport, Pa.; Jenkins Bros. Inc., Bridgeport, Conn.; Paxton-Mitchell Co., Omaha, Nebr.; Sterling Steel Foundry Co., Braddock, Pa., and Sumner Iron Works, Everett, Wash. Companies receiving their fourth gold stars included General Machinery Corp., Hamilton, O.; Koppers Co., Bartlett Hayward Division, Baltimore, and National Malleable & Steel Castings Co., Sharon, Pa.

• • •

Production of aluminum and magnesium ingot have been cut further by WPB. Plants affected by the aluminum curtailment are the government-owned facilities at Spokane, Wash., Los Angeles, Troutdale, Oreg., and Jones Mills, Ark. In addition, Aluminum Co. of America is reducing production in its own plants at Alcoa, Tenn., Badin, N. C., Massena, N. Y., and Vancouver, Wash. Primary magnesium ingot production gradually is to be cut 40 per cent to about 14,000,000 pounds monthly. Government-owned plants at Las Vegas and Gabbs, Nev., and at Austin and Velasco, Tex., are the ones affected. The Las Vegas plant eventually is to be shut down.

• • •

Cast armor plant of American Steel Foundries, East Chicago, Ind., was reopened Aug. 28 to meet the Army's accelerated tank production program. The $26 million government-owned plant, which originally began operation in October, 1942, was ordered to cease production last May and was put in a standby condition.

• • •

Machine tool shipments of $33,916,000 in July were off 18.2 per cent from June, according to WPB. New orders totaled $33,224,000, off 3 per cent from June, while backlogs of $194,588,000 at the end of July would require about 5½ months to fill at that month's shipping rate.

• • •

Production of brass and bronze ingot during the first half this year totaled 278,817 tons, compared with 249,336 tons the first 6 months of 1943, according to WPB. Output for all of 1943 was 499,367 tons. Defense Council of the Ingot Brass and Bronze Industry reports July shipments by 55 ingot brass and bronze makers of 40,532 tons, against 40,677 tons in June, representing more than 95 per cent of the industry.

• • •

June production of steel castings by companies reporting to the Department of Commerce totaled 157,444 tons, against 161,783 tons in May and 163,934 a year ago, representing operations of 71.1, 72.7 and 81 per cent of capacity, respectively. Orders booked, less cancellations, rose from 176,993 tons in May to 181,816 in June. This compares with 171,774 in June, 1943.

• • •

Ordnance Steel Foundry Co., Bettendorf, Iowa, is reported to have plans for doubling its plant capacity through installation of new equipment at a cost of about $750,000. Equipment is to include electric furnaces, molding machines, conveyors, sand handling and conditioning equipment, and heat treating facilities.

• • •

Plants of Farrel-Birmingham Co. Inc. at Ansonia and Derby, Conn., and Buffalo have been awarded the United States Maritime Commission "M" in recognition of its outstanding production of gear drive for cargo ships and seagoing tugs.

• • •

Meehanite Metal Corp.'s London office has completed a contract with the Jay Engineering Works Ltd., Parganas, India, for manufacture of meehanite castings.

• • •

Delta Mfg. Co., Milwaukee, has been notified of the second renewal of its Army-Navy "E" award for continued excellence in the production of machine tools.

• • •

Pioneer Foundry Corp., Milwaukee, has let contract to Peters Construction Co., that city, for a one-story foundry addition 30 x 140 feet.

• • •

National Engineering Co., Chicago, again has been awarded the Army-Navy "E" in the form of renewal of its previously won citation for war production.

• • •

Dayton Malleable Iron Co., Dayton, O., has received WPB authorization for installation of dust collecting equipment to cost $54,585, permit to expire Dec. 31.

• • •

Columbia Foundry is the firm name under which Louis J. Martin and William J. Walmsley have published a certificate that they are conducting business at 1960 East Gage Avenue, Los Angeles.

• • •

Atlantic Steel Castings Co., Chester, Pa., has been authorized by Defense Plant Corp. to spend $35,000 for plant expansion at Crum Lynne, Pa., bringing overall DPC commitment to $1,000,000. Mueller Brass Co., Port Huron has received a $200,000 DPC authorization for equipment at a plant there.

• • •

June shipments of marine fittings hardware totaled $3,676,000 in value, off 14 per cent from May, according to WPB. June backlogs were down 10 per cent and represented about 4 months' shipments at the May rate.

• • •

United Pattern Mfg. Co. is the firm name under which Walter J. Cunningham and Albert Johnson have published a certificate that they are conducting business at 1332 East Florence Avenue, Los Angeles.

• • •

Defense Plant Corp. has allocated $350,000 for establishment of a research unit at the plant of Basic Magnesium Inc. near Las Vegas, Nev., for production of castings, forgings and extrusions.

• • •

Empire Stove & Furnace Co. Ltd., Owen Sound, Ont. plans to replace its plant and rebuild the foundry recently destroyed by fire which caused $100,000 damage.

• • •

Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich., has let contract to Ramberg Co., Muskegon, for a steel sleeve foundry at plant No. 4 estimated to cost $75,000.

• • •

Draper Corp., Hopedale, Mass., has let contract to Bathelt Construction Co., Holyoke, Mass., for improvements to its foundry and conveyor system at estimated cost of $90,000.

• • •

Magnesium Casting Co., Hyde Park, Mass., plans construction of a two-story factory 70 x 146 feet, to cost about $40,000.

• • •

Equipment Engineering Co., Los Angeles, is constructing a 40 x 37-foot addition to its foundry, to cost $4000.

• • •

Modern Pattern & Foundry Co., Vernon, Calif., will construct an addition to its plant, to cost $1800.

• • •

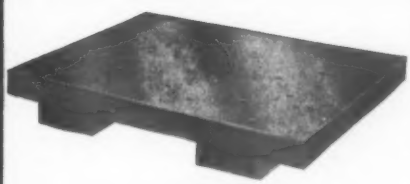
Loss of $20,000 was sustained when the Brooks Foundry, Albion, Mich., recently modernized, burned Aug. 9.

• • •

Birdsboro Foundry & Machine Co., Birdsboro, Pa., has closed its foundry at Reading, Pa.

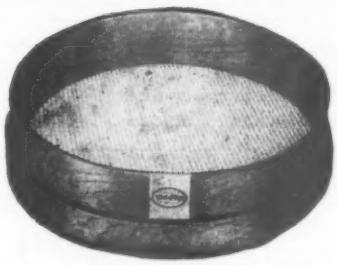
CMD FOUNDRY SPECIALTIES

Save Time and Reduce Costs



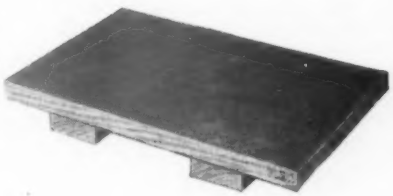
CMD FIRE-RESISTANT BOTTOM BOARDS

CMD WOOD FLOOR FLASKS

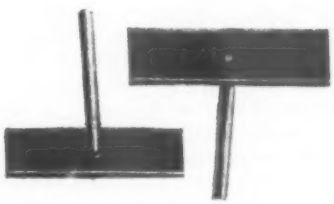


TRI-PLY FOUNDRY RIDDLE

CMD NON-WARP, NON-BURN COMPOSITION JACKET



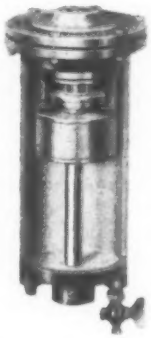
CMD WOOD BOTTOM BOARD



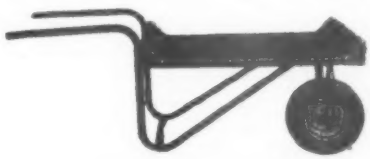
SLAG SKIMMING AND RABBLING IRONS

CMD TYPE A CHIPPING HAMMER
Combination drift and chisel

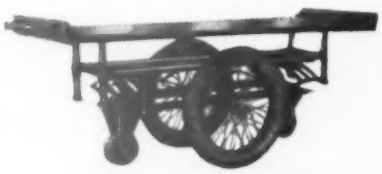
CMD TYPE C CHIPPING HAMMER
For general hand chipping



TEXTITE AIR SEPARATOR
Cools, cleans and dries the air in one operation. *No moving parts.* Saves air tools. Nothing to replace.



CMD PNEUMATIC CORE BARROWS
With single wheel (as shown here) or two wheels



CMD PNEUMATIC CORE TRUCKS
Minimize core chafing and breakage

Foundries have been relying on CMD for time-saving, labor-saving supplies and equipment for 23 years. Write now for catalog on the complete CMD line!

Manufacturers of a complete line of core-conveying equipment and other foundry specialties

CHICAGO MANUFACTURING & DISTRIBUTING CO.

Dept. 6F, 1928 West 46th St. • • **Chicago 9, Illinois** • •

READERS' COMMENT • • •

Stainless Stirring Rods

To The Editors:

In the questions and answers section of the August, 1944 issue of The Foundry (page 95), stirring rods for nonferrous metals are discussed.

Carpenter Steel Co., Reading, Pa., make a 20 per cent chromium, 1 per cent copper analysis (Type 442) which they call their No. 3 stainless; we use this material in ⅝ rounds, hot rolled and annealed, for stirring brass and bronze. The more common 18-8 stainless (Type 302) will not work as it is subject to an intercrystalline corrosion when in contact with molten brass. Such stirring rods are not cheap, but we think they last long enough to be worth the added cost.

R. W. Parsons

Ohio Brass Co.
Mansfield, O.

Gating Steel Gears

To The Editors:

In the June issue of The Foundry a question was asked regarding the risering of gear blanks. Does the answer apply to cast iron only, or is it equally applicable to steel?

We are making cast steel gear blanks and are using about 40 per cent of the weight of the casting in gate and risers. We horn gate into the hub and have a full riser on the hub with risers opposite every spoke on the rim.

This blank is 44 inches in diameter, has six spokes, a 10-inch hub, and the rim is 2½ x 8 inches. The risers on the rim are 6 inches in diameter and are flared out along the rim so the base of the riser covers 14 inches of the rim. No pad is used.

These gears are made of alloy steel and gave considerable trouble due to shrinkage at the spoke and cracking at the edge or through the risers before the above mentioned practice was used.

O. E. Erickson

Pacific Iron & Steel Works,
Tacoma, Wash.

Editor's Note:

So far as we know, the procedure of gating gear blanks, flywheels and similarly shaped castings through pop-gates on the rim or periphery is practiced only with gray iron and some nonferrous alloys.

While in theory the practice should work with steel, we believe that considerable experimentation and study would be required to iron out all the kinks that might show up. Steel has a much higher shrinkage than gray iron, it is poured at much higher temperatures, and begins to freeze at a much higher temperature. Hence, the size and number of the pop-gates would have to be determined carefully to have them function properly. Again, removal of gates and risers from steel castings is a different proposition than with gray iron where they can be knocked off with a heavy sledge hammer—and it might be more economical to use a few large risers than many small ones.

In view of the large risers you are using (flaring from 6 to 14 inches) it appears to us that you might be able to obtain some reduction in size through use of carbon rods as described in the July, 1944 issue by Vosburgh and Larson. Possibly you might be able to eliminate the flaring now used, and even reduce the 6-inch diameter to say 5 or 4½ inches. It is a possibility worth investigating since the metal is worth more in the casting than in the gates and risers.

"V For Victory"

To the Editors:

How do you like our "V for Victory" on the enclosed? Possibly it is an omen! It is a photomicrograph of an unetched

piece of steel at 200 diameters. It is not faked in any way—it just happens that the inclusions formed the "V" design.

E. R. Starkweather

Carborundum Co.
Niagara Falls, N. Y.

Removes Aluminum

To the Editors:

We just have received your issue of June, 1944 and we notice on page 134, a reply to a query raised by one of your readers who is anxious to remove aluminum from bronze.

Your answer states that you understand copper oxide has been used with success, but may we point out that there exists a very efficient and simple method for the removal of aluminum from copper alloys by means of Foseco aluminum remover. The chemical reaction employed by this method is, as we already have said, simple and efficient, and we can guarantee the removal of aluminum from ¼ or ½-per cent. The removal can be undertaken even at a later stage of the melting process. The melting time will not be increased unduly, no obnoxious fumes develop, and the method itself is economical.

The method is used daily in Britain, and to substantiate our statement we have the pleasure of attaching a few test results, suitably summarized. We should like to add that the product mentioned is manufactured in the United States by Foundry Services Inc., 280 Madison avenue, New York 16.

In conclusion, may we point out that this letter is not written with a view to criticizing the answer given in any way, but only to draw your attention to a method which we know will be more efficient and better.

Eric Weiss

Foundry Services Ltd.
Birmingham, England

How To Develop the Safety Spirit

Safety Bureau, Welfare Division, Metropolitan Life Insurance Co., New York, has issued a 46-page bulletin under the title *Developing Safe Employes*, which is based on a study of accident prevention activities in a number of industrial organizations. While not intended to be an inclusive review of methods for the development of safe employes, it is presented as an aid to industry in fostering such activities. Starting with the premise that the basic responsibility rests upon management to provide safe working conditions, the report deals with the need for a well developed program of employe induction, training, supervision and education as a basis for the correction of unsafe practices.

Book Review

Extrusion of Metals, by Claude E. Pearson, cloth, 205 pages, 5½ x 8½ inches, published by John Wiley & Sons Inc., New York. Price $3.75.

During the past 30 years the extrusion process has undergone numerous developments, and now is ranked as one of the standard methods by which metals are wrought to shape. While considerable has been written on the subject, it heretofore has been scattered widely, and dealt with specific phases so that it was difficult to obtain a comprehensive idea of the various branches. However, in this book the author has collected the scattered information, and presented a concise description of extrusion relating to different classes of work.

Divided into 10 chapters the book covers such phases as history of the process, extrusion of lead and other soft metals, lead cable sheathing, hot extrusion of hard metals, flow of metals, pressure of extrusion, metals and alloys for hot extrusion, properties of extruded metals, impact methods of extrusion, and some special applications of extrusion.

AGAIN AVAILABLE

CROWN HILL SEACOAL

A NAME TO REMEMBER!

CROWN HILL

SEACOAL FACING

● Crown Hill Seacoal rapidly became a favorite during the short time it was available. Its high volatile, combined with very low sulphur and ash content, ensured good results every time.

Now that rebuilding of our new modern plant is completed and prompt shipment can be assured, we urge you to specify Crown Hill Seacoal.

A grade of Crown Hill is made to suit every need. Try it in your foundry—as soon as you can!

CROWN HILL MEANS QUALITY SEACOAL

THE FEDERAL FOUNDRY SUPPLY COMPANY

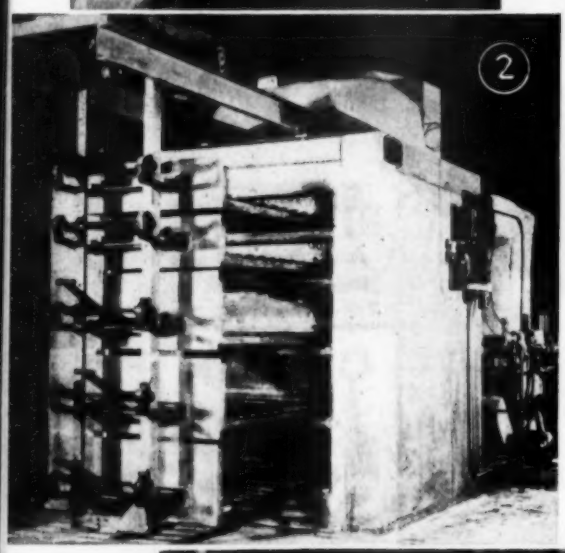
4600 East 71st Street • Cleveland 5, Ohio

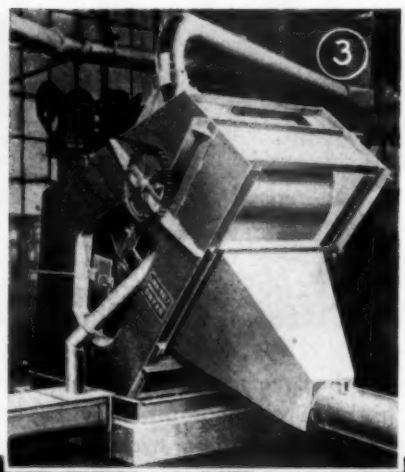
Mines and Plant
CROWN HILL, W. VA. • CHICAGO • CHATTANOOGA, TENN. • DETROIT • MILWAUKEE • MINNEAPOLIS • NEW YORK • ST. LOUIS • RICHMOND, VA. • BYTON, WYO.

NEW EQUIPMENT & SUPPLIES

(1)—Band Saw: DoAll Co., 254 North Laurel Avenue, Des Plaines, Ill., has developed a saw blade for rapid cutting of metals and other materials. It is said to eliminate operator fatigue, give increased production and do away with costly resharpening and resetting. Tooth gullets are elongated to provide plenty of room for fast removal of chips. Teeth are securely anchored to withstand shock, and are made fast in their precision set position by means of accurately controlled heat treatment. Made of high carbon steel, the saw is available in widths from ¼-inch to 1 inch in various sets and pitches.

(2)—Oven: Carl Mayer Corp., 3030 Euclid Avenue, Cleveland 15, announces a new rolling-drawer type oven intended principally for core baking but also adapted to all types of drying. The unit is gas-fired by convection. Five drawers, each 36 inches wide, 48 inches long and 10 and 5 inches deep, may be operated selectively, each drawer being furnished with individual operating equipment. One or more drawers may be opened simultaneously. The accompanying view shows the drawers open. Oven housing is made of 16 gage steel panels, containing 4-inch glass wool insulation. Panel edges are channel, triple slotted patented construction. Outside dimensions are 5 feet wide, 6 feet 4 inches long and 7 feet 3 inches high.

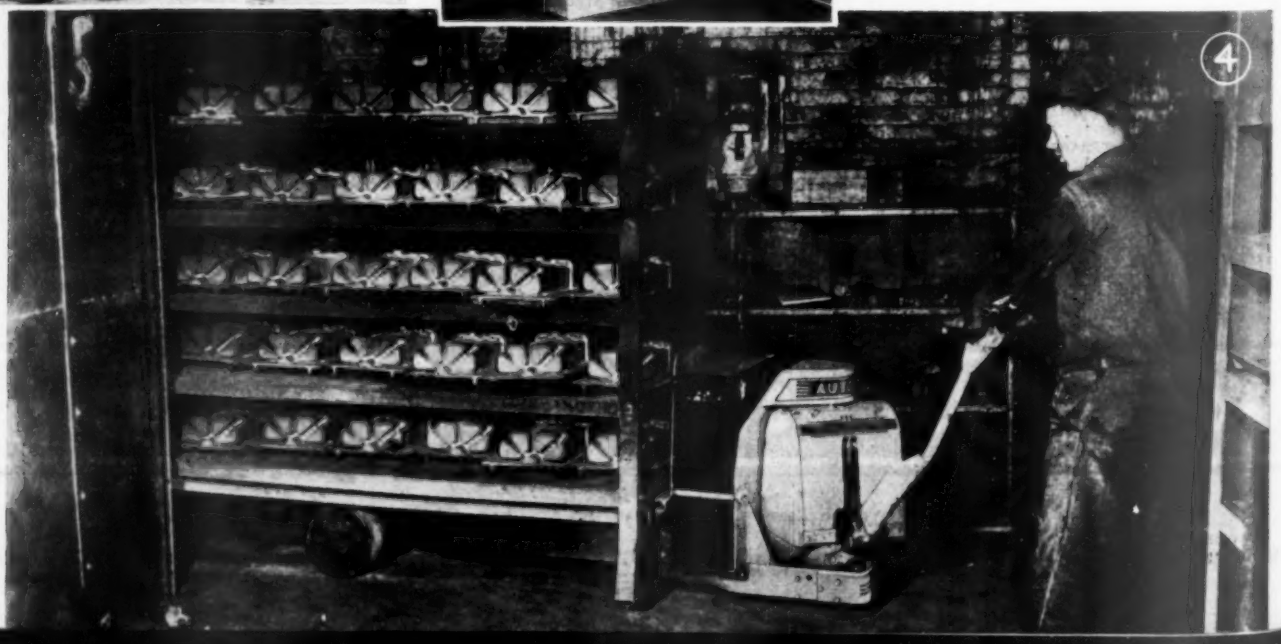




(3)—Dryer: Link-Belt Co., 307 North Michigan Avenue, Chicago, is offering a new type unit for the low cost drying (or cooling) of bulk materials which do not require long retention periods. It is fully enclosed, containing moving louvres supported on power-operated endless chains. These louvres present the moving mass of material to heated air which is drawn through it and exhausted at the top of the dryer. Ample passages between louvres permit air circulation at low velocity. Fine materials can be carried on the louvres without clogging.

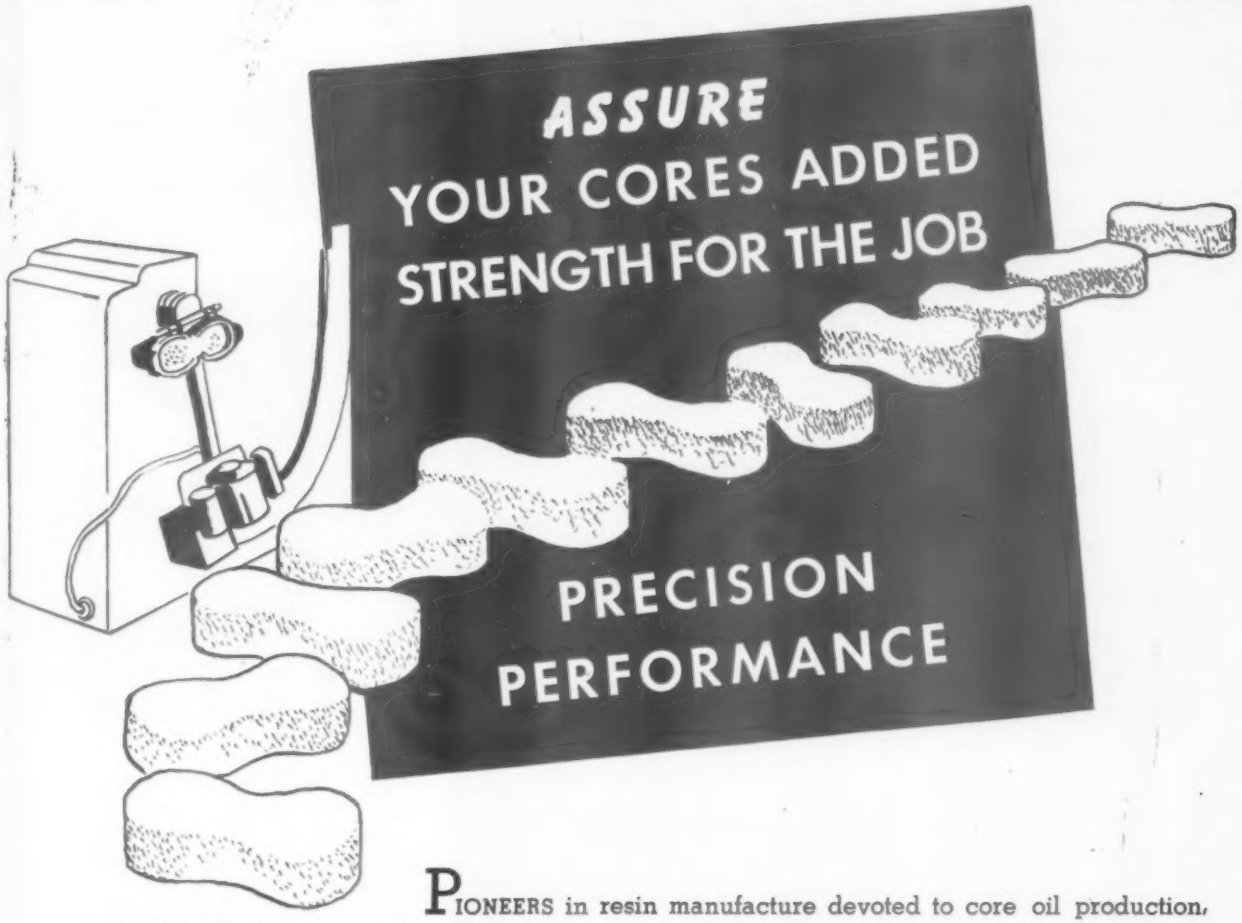
(4)—Hand Truck: Automatic Transportation Co., 121 West Eighty-Seventh Street, Chicago 20, has developed a foot-operated hydraulic lift truck equipped with electric-powered front wheel drive. It is designed for economical lifting and short hauling of loads at safe working speeds, either on skid platforms up to 6000 pounds by means of the platform type unit, or pallet loads up to 4000 pounds by means of the fork type unit. Standard equipment includes a battery, said to provide capacity to operate 8 to 10 hours depending on handling requirements, and portable cabinet plug-in-type charging equipment. Standard platform lengths are 36 to 72 inches; widths 20 and 26½ inches with heights 6, 7, 9 and 11 inches; lift from

(*Continued on page* 150)



VELSICOL

RESIN CORE OILS



PIONEERS in resin manufacture devoted to core oil production, VELSICOL technicians have developed resins particularly to accelerate and fortify the hardening action of the drying oil. Cores made with VELSICOL CORE OILS possess strength ***where*** it is needed and ***when*** it is needed, cores that can stand the gaff. And yet this strength is not gained at the sacrifice of such desired properties as low gas evolution, rapid collapsibility, clean shake out. Whether you are pouring gray iron, steel, malleable, or one of the light metals, VELSICOL CORE OILS will give your cores performance as specified.

You men with foundry "know how" find out at first hand how VELSICOL can improve your castings production by reducing core handling time and cutting down rejects.

Write for samples and information direct to the VELSICOL CORPORATION or to the representative serving your territory listed below.

The Foundries Materials Company, Coldwater and Detroit, Michigan, and Hammond, Indiana; Midwest Foundry Supply Company, Edwardsville, Illinois; H. S. Stoller & Company, Akron, Ohio; Thiem Products Company, Milwaukee, Wisconsin.

VELSICOL
Corporation

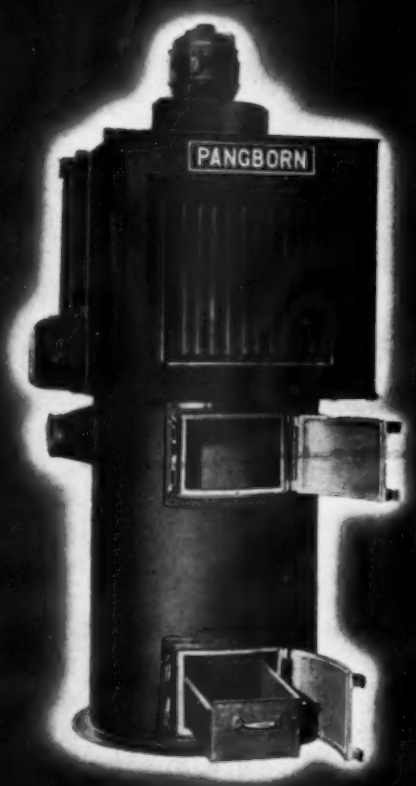
GENERAL OFFICES: 120 EAST PEARSON STREET, CHICAGO

VELSICOL

PLANT: MARSHALL, ILLINOIS

« PROTECTION FOR PRODUCTION »

Something new in Dust Control equipment. A Unit Type Dust Collector of rugged construction for industrial applications, based on Pangborn's 40 years experience in solving dust problems throughout industry.



A FEW OF THE MANY NEW FEATURES

- Self-contained. Occupies minimum floor space.
- Flexible in arrangement to permit adaptation to variety of field conditions.
- Easily accessible for inspection, servicing and adjustment.
- Minimum piping and installation expense.

Arrangement details, operating data and photographs are available in Bulletin No. 910. A copy will be sent to you upon request—no obligation, of course!

ARMY E NAVY

PANGBORN

WORLD'S LARGEST MANUFACTURER OF DUST COLLECTING AND BLAST CLEANING EQUIPMENT

PANGBORN CORPORATION · HAGERSTOWN, MD.

(*Continued from page* 148)

low to high position is 3½ inches. Standard pallet fork lengths are 30 to 60 inches in 2-inch steps; width 27 inches; height in low position 3⅜ inches with 3¾-inch lift; elevated height is 7⅛ inches. Drive control gives two speeds in both forward and reverse.

Core Drawing: Federal Foundry Supply Co., 4600 East Seventy-First Street, Cleveland, has designed a new core drawing machine in which the core tray is supported by a stand entirely separate from the rest of the unit. This permits the operator to draw any number of cores to the capacity of the tray with no danger of vibration from the drawing head shaking down green cores already made. The drawing head, accurately machined, has 100 grooves on

each of its two faces. Since the grooves are closely spaced it is necessary for the coremaker to "feel" for a fit of the box against the drawing head—almost anywhere that the box is placed against the head there will be an accurate lift. Only one vibrator is required, although two operators can work simultaneously on opposite sides of the machine without interfering with each other. Vibrator may be either air or electric type.

Marker: Floquil Products Inc., 1974 Broadway, New York 23, is offering a new fountain type marker for marking more than 100 different basic materials. Seven standard colors are available which are quick drying and resistant to water, weather and abrasion. The marker has only three nonmoving parts and includes 12 interchangeable nibs.

Aluminum Solder: Eutectic Welding Alloys Co., 40 Worth Street, New York 13, is marketing a new free-flowing solder for aluminum which is claimed to flow on aluminum as readily as ordinary lead-tin solder on tin plate, brass or copper. The solder will work on cast aluminum as well as on wrought aluminum, on steel, copper and nickel

(*Continued on page* 152)

BAR OF *What?*

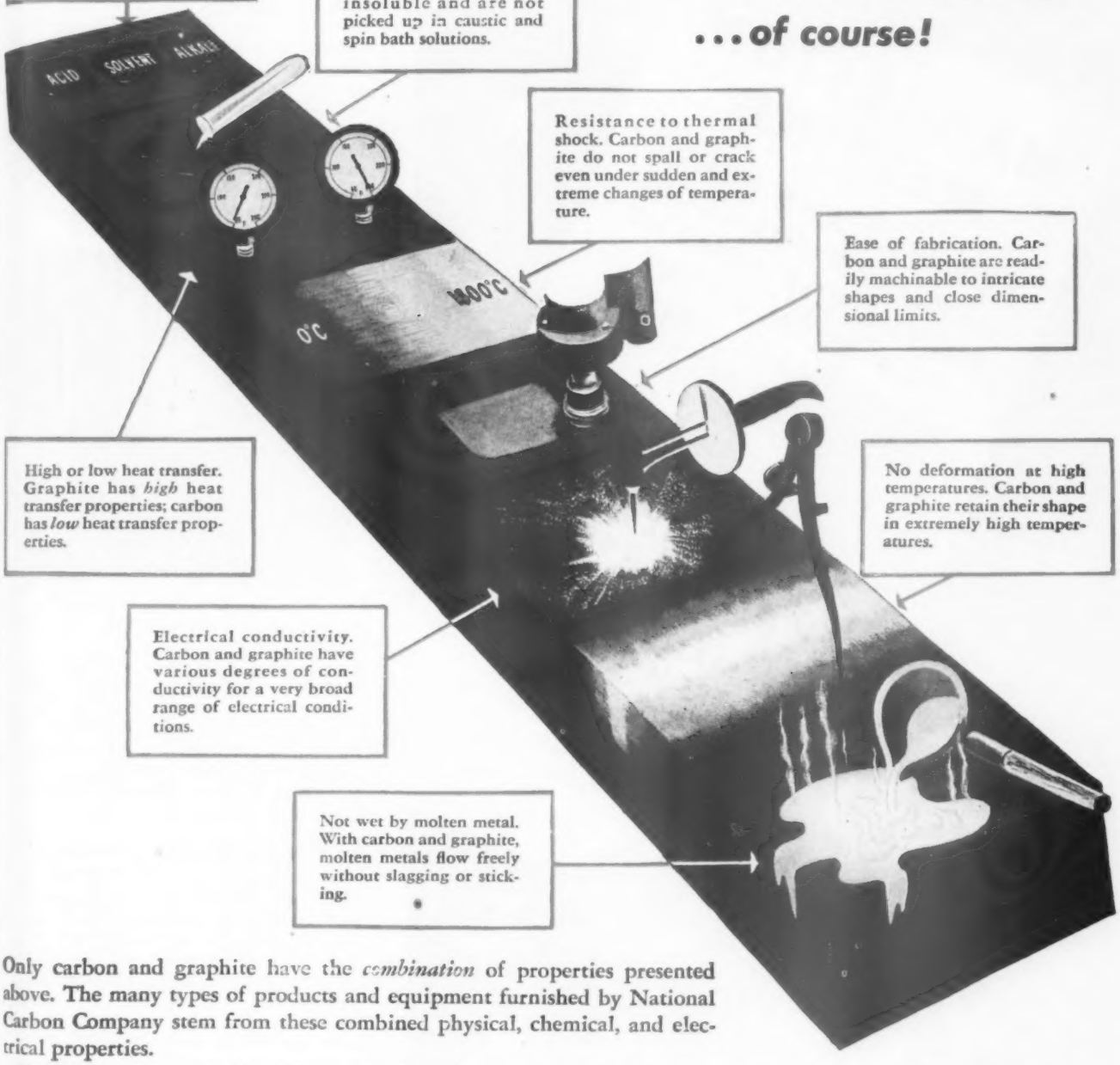
Carbon, graphite, or "Karbate" material* ...of course!

Corrosion resistance. Carbon and graphite are inert to all but highly oxidizing conditions, and to most acids, alkalies and solvents.

Absence of contamination. Carbon and graphite are insoluble and are not picked up in caustic and spin bath solutions.

Resistance to thermal shock. Carbon and graphite do not spall or crack even under sudden and extreme changes of temperature.

Ease of fabrication. Carbon and graphite are readily machinable to intricate shapes and close dimensional limits.



High or low heat transfer. Graphite has *high* heat transfer properties; carbon has *low* heat transfer properties.

No deformation at high temperatures. Carbon and graphite retain their shape in extremely high temperatures.

Electrical conductivity. Carbon and graphite have various degrees of conductivity for a very broad range of electrical conditions.

Not wet by molten metal. With carbon and graphite, molten metals flow freely without slagging or sticking.

Only carbon and graphite have the *combination* of properties presented above. The many types of products and equipment furnished by National Carbon Company stem from these combined physical, chemical, and electrical properties.

We urge you to study them. They not only make possible the present applications but are constantly suggesting new ones.

Many of these applications can further improve your manufacturing operations by decreasing interruptions, speeding up output, and cutting production and maintenance costs.

★ BUY UNITED STATES WAR BONDS ★

The word "Karbate" is a registered trade-mark of National Carbon Company, Inc.

*Carbon or graphite made impervious to seepage.

NATIONAL CARBON COMPANY, INC.
Unit of Union Carbide and Carbon Corporation
UCC
General Offices: 30 East 42nd Street, New York 17, N. Y.
Division Sales Offices: Atlanta, Chicago, Dallas, Kansas City, New York, Pittsburgh, San Francisco

HAUSFELD FURNACES

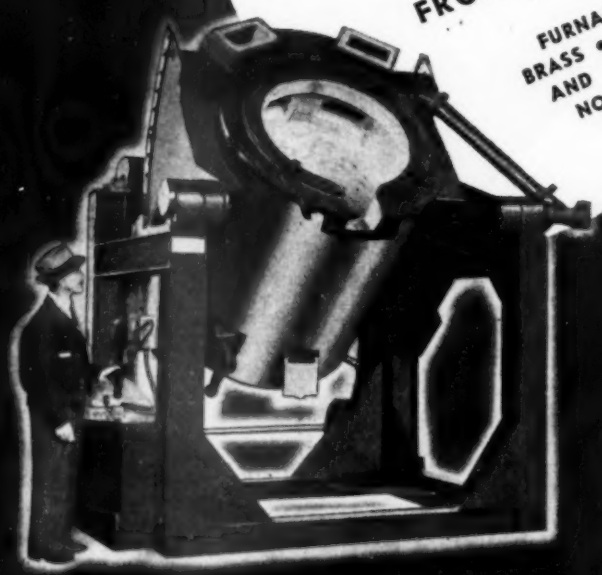
MAGNESIUM MELTING

FOR WAR AND PEACE
HAUSFELD FURNACES
SUPPLY THE DEMAND
FOR BOTH LARGE
AND SMALL UNITS
FOR OIL AND GAS FUELS

ILLUSTRATION SHOWS
1700 LB. CAPACITY
FOUR BURNER GAS FIRED
MOTORIZED
NOSE TILTING FURNACE

STATIONARY SIZES
FROM 100 LBS. UP

FURNACES FOR
BRASS • ALUMINUM
AND ALL OTHER
NON-FERROUS
ALLOYS



The Campbell-Hausfeld Co.

300-320 MOORE ST. HARRISON, OHIO

(*Continued from page* 150)

alloys. It is said to be suitable for applications where the completed joint will not be heated above 212 degrees Fahr. under working conditions. Its low temperature of application, 400 degrees, makes it possible to join thin sheet metal without danger of distortion. The solder will bond to cast iron if the latter has been tinned first with a zinc-base solder.

Surface Inspection: Rex McDill, 5109 Mayfield Road, Cleveland, announces a new method for rapid and economical reproduction and examination of surface finishes in magnifications up to 100 diameters or more. The process, called Faxfilm, consists of softening one side of a piece of clear plastic film by use of a small amount of solvent so that when it is pressed onto any surface, it penetrates every unevenness of the surface. The piece of film is mounted

in a cardboard frame which fits any standard projector, where it can be enlarged showing all contours in three dimensions. Surface irregularities cause variations in thickness of the film, thereby varying the amount of light that can be projected through it and resulting in ripples, waves, etc. Illustrated is the surface of a machine-finished steel bar enlarged to 100 diameters.

File Renewal: Sav-A-Tool Corp., 3581 Eastern Avenue, Cincinnati 26, has developed what is said to be an entirely new method for restoring old or worn files without affecting the original temper. All cutting edges are sharpened, burrs are removed, and the files are antirust treated. Cutting life of renewed files is reported to average 80 to 90 per cent that of the original files, and the process may be repeated as many as three times.

Boring, Reaming: Haynes Stellite Co., Kokomo, Ind., is offering boring and reaming blades made of cobalt-base alloy. Boring blades are used for rough and finish boring operations on cast iron, malleable iron, brass and bronze, and for rough and semifinish boring operations on steel. Reamer blades are used chiefly on cast iron, although they have been used successfully on

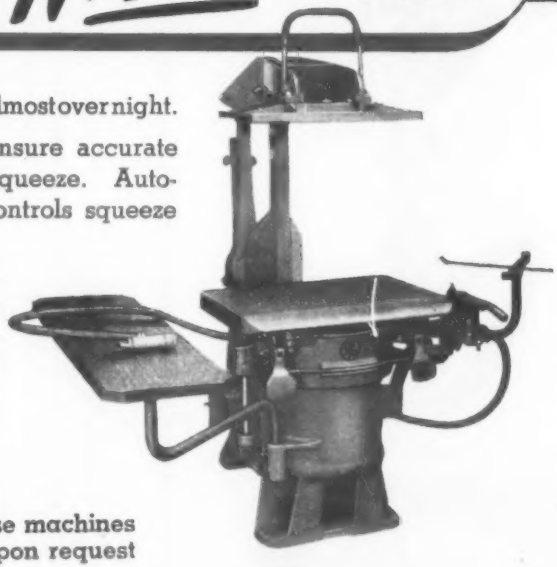
(*Continued on page* 156)

For SPEED THROUGH SIMPLICITY—the SPO No. 100 SERIES

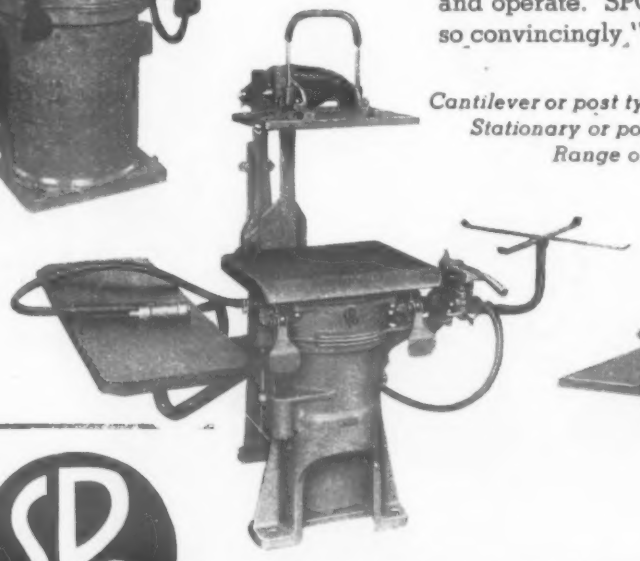
This line of business-like SPO Molding Machines performs fast and profitably. Air-operated, of the jolt-squeeze type, they make both cope and drag molds, excelling on work that involves matchplates and gated patterns. They outproduce hand or bench methods 3 to 1.

Moving parts are few, shielded from sand and grit. Valves and other operating members are easy to reach and operate. SPO No. 100's are so convincingly "ABC" that beginners become skilled workers almost over night.

Balanced design and rigidity insure accurate molds, packed evenly by jolt squeeze. Automatic pressure release valve controls squeeze pressure on molds. Open-end squeeze head allows use of extra long flasks. Squeeze plate adjustable in 2" steps for various flask heights. Safety stop prevents squeeze piston from leaving cylinder.



Cantilever or post type squeeze heads. Stationary or portable models. Range of sizes.



Bulletins on these machines are available upon request

SPO INCORPORATED

Manufacturers and Specialists in Molding Machines, Vibrators and Patterns for Production

7500 GRAND DIVISION AVENUE • • CLEVELAND 5, OHIO

SAND *Quality*

THE SCREENARATOR...it's the lowest cost portable sand conditioner! Ideal for small or medium sized foundries making all types of castings, or for large foundries as an auxiliary sand preparation unit. It's fast, versatile, and produces a more flowable, rammable sand!

THE SCREENARATOR thoroughly screens the sand...frees it from burn cores, gaggers, and other foreign matter. It cuts and breaks lumps, aerat the sand, and then aerates it for the second time as it piles the conditione sand between benches, into boxes, hoppers, windrows or wherever desire

Determines CASTING QUALITY

THE SCREENARATOR produces a clean, well tempered sand that assures smoother finished castings. Its portability, thorough conditioning, and aerating action provide both jobbing and production foundries with sand the *way* they want it and *where* they want it.

Workers like the *Screenarator's* easy-moving and free-wheel rolling. Foundry superintendents find it an answer to the labor shortage. Casting users everywhere comment on the excellent quality and finish of castings made with Screenarated sand!

Operator easily moves Screenarator to desired position from floor to floor.

Electrically operated, the Screenarator plugs into an available power outlet.

Convenient height and angle of screen makes shoveling easy.

Conditioned sand is discharged as far as 25 feet . . . elevated 2 to 10 feet.

Compare the Screenarator's first cost, power consumption, and capacity with any other portable sand conditioner. A B&P Engineer will be glad to advise you where and how it can be used to best advantage. See for yourself what a better job the Screenarator can do on the sand in your shop . . . write for complete information and give it a trial now.

THE BEARDSLEY & PIPER COMPANY

2541 North Keeler Avenue, Chicago 39, Illinois

The Beardsley & Piper Company are manufacturers of Speedslingers, Speedmullors, Sandslingers, Screenarators, Mulbaros, Shake-outs, Sand Conditioning Machines, Gyratory Screens

"fingertip"

control

1.—Each of three switches assembled in a strong, light, dust-tight case, consists of two buttons, assembled as a unit. One switch controls the travel of the crane along the runway; another controls the movement of the hoist along the single beam of the crane, while the third switch regulates the up and down movement of the hook.

2.—Each button, as it is pressed inward, makes 5 electrical contacts, corresponding to 5 independent speeds in each direction of rotation.

3.—Emergency stop switch located at lower end of assembly opens all circuits.

means fast, accurate load handling

Shepard Niles Electric Cranes & Hoists go to work on the toughest handling jobs by simply pushing a button. Loads are lifted, conveyed, deposited—swiftly and safely—rehandling is eliminated—operating costs materially cut.

With dependability and accuracy, Shepard Niles selective, 5-speed, push-button control is master of every crane or hoist movement, whether accelerating or decelerating.

Shepard Niles Single Beam Cranes are available in "Push-type", "Hand-racked" and "Motor-driven" types of crane propulsion, in Over-running, Inner-running or Under-running construction. Capacities from ¼ ton to 10 tons.

MAINTENANCE MANUAL—FREE ON REQUEST.
Describes maintenance of Shepard Niles Cranes & Hoists—amply illustrated with line and sectional drawings. 106 pages.

E

Shepard Niles

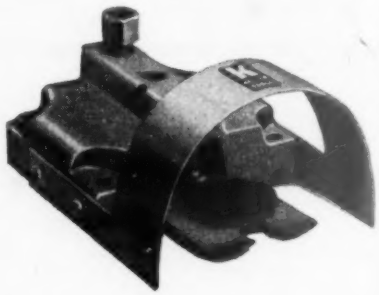
CRANE & HOIST CORPORATION

630 SCHUYLER AVE. • MONTOUR FALLS, N. Y.

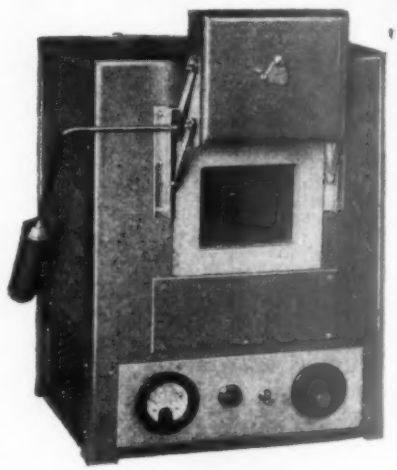
(*Continued from page* 152)

malleable iron, brass and bronze. They are not recommended for finish reaming steel. The blades are available in two grades and furnished to users' specifications, finish ground to required tolerances.

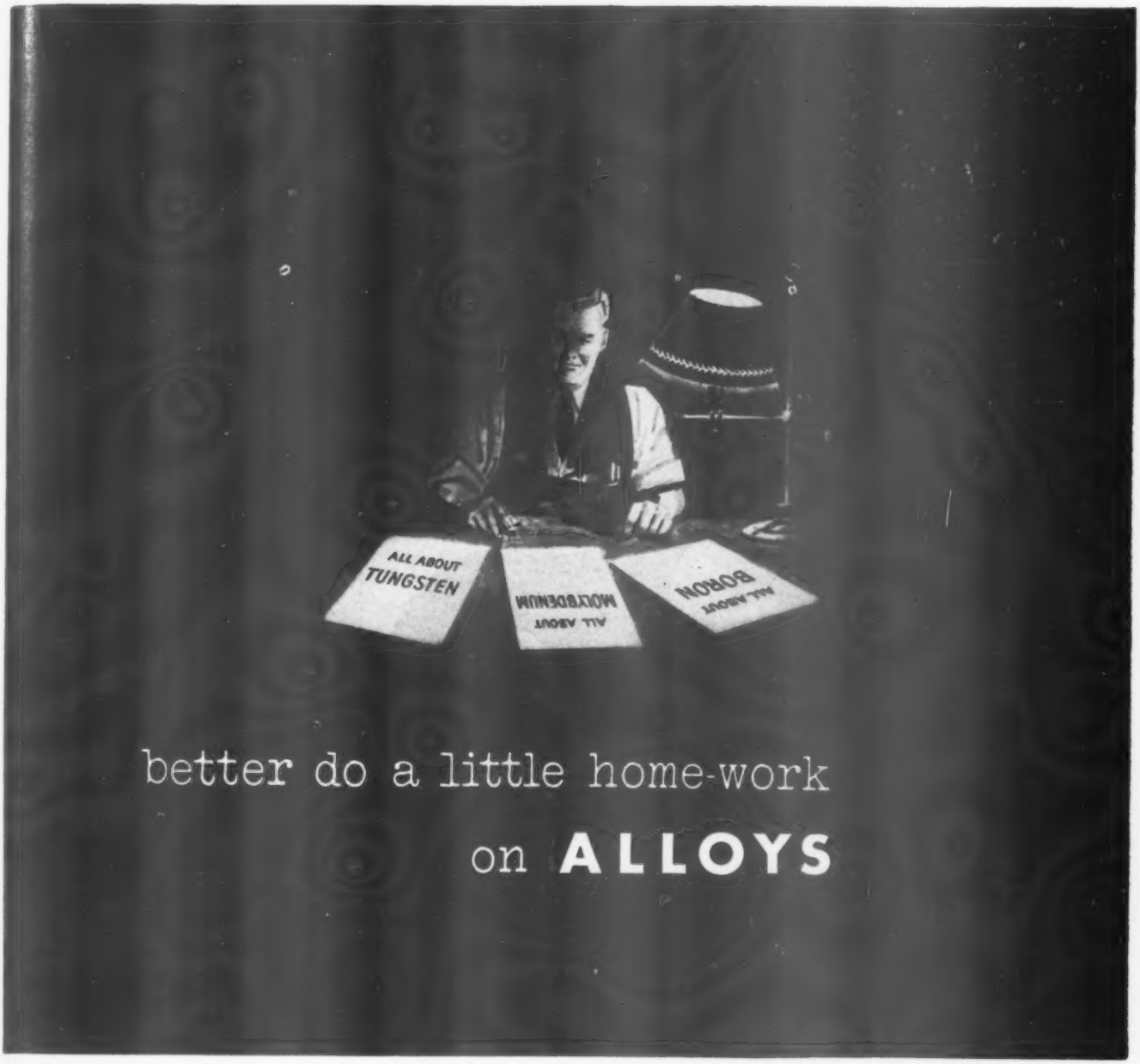
Foot Valve: Keller Tool Co., Grand Haven, Mich., is offering a new foot valve for use with air operated equipment. It is especially recommended for use on tools where it is desirable that the operator has both hands free. Both locking and nonlocking types are available. A lock on the former holds the pedal in the open position, but it is released by a touch of the operator's toe. The locking device also may be adjusted to change the unit to the nonlocking type. A kick guard which prevents accidental operation contributes to safety of the operator.



Electric Furnace: Thermo Electric Mfg. Co., 480 West Locust Street, Dubuque, Iowa, announces a new electric furnace for general industrial heat treating and laboratory use at temperatures up to 1850 degrees Fahr. It measures 21 inches wide, 31 inches high and 18 inches deep, with the heating chamber 5½ x 4½ x 10½ inches. Instrument panel built into the base includes an input controller, indicating pyrometer, pilot light to indicate operation, and switch. Construction features a heavy, welded steel frame with transite sides and 4¾ inches of insulation. Heating element is nickel-chromium alloy in coiled form, which completely surrounds the muffle core. Door is supported by two



(*Continued on page* 158)



The use of alloys has grown and is growing because the properties of metals for war purposes must go far beyond former requirements, and because alloying materials are now available in ever-increasing amounts, and because new metallurgical knowledge has improved the efficiency and the economy of employing such materials.

The end of the war will not reverse all this. In many quarters, rather, it will intensify competition and the urge to improve production at the lowest possible cost.

Molybdenum, Tungsten, and Boron have all been important to the war economy and each in its own way will be important to the economy of reconversion. The Molybdenum Corporation has prepared helpful information and advice on the most advanced applications of all these three much-discussed elements and the most approved techniques in using them. Correspondence is invited.

AMERICAN Production, American Distribution,
American Control—Completely Integrated ·
Offices: Pittsburgh, New York, Chicago, Detroit, Los Angeles, San Francisco, Seattle.
Sales Representatives: Edgar L. Fink, Detroit; H. C. Donaldson & Co., Los Angeles, San Francisco, Seattle
Works: Washington, Pa.; York, Pa.
Mines: Questa, N. M.; Yucca, Ariz., Urad, Colo.

MOLYBDENUM CORPORATION OF AMERICA
GRANT BUILDING PITTSBURGH, PA.

MCA

FOR SALE . . .
Better Grinding Wheel Production

From the Cortland Engineer right through the entire organization each member of the outfit is concerned with one thing: not just making good wheels, but . . . *the best possible results for you in grinding wheel production!*

The field engineer studies your work and decides the type of wheel you need . . . the laboratory specifies the abrasive, grain, grade, structure and bond that will do the job best, and most economically . . . and Cortland Quality Control throughout all manufacturing operations makes certain that you get what you want —*in every wheel shipped.*

The result? A growing list of satisfied users . . . faster grinding wheel production . . . higher ratio of stock removal to wheel wear . . . longer life and lower costs.

Why not give this combination a trial in your snagging work?

17

Write CORTLAND GRINDING WHEELS CORP., 6 Cortland Street Chester, Massachusetts.

For Better Snagging

CORTLAND

(*Continued from page* 156)

sets of parallel levers and when opened moves upward and out of the way. It is heavily insulated and counter-balanced for easy operation.

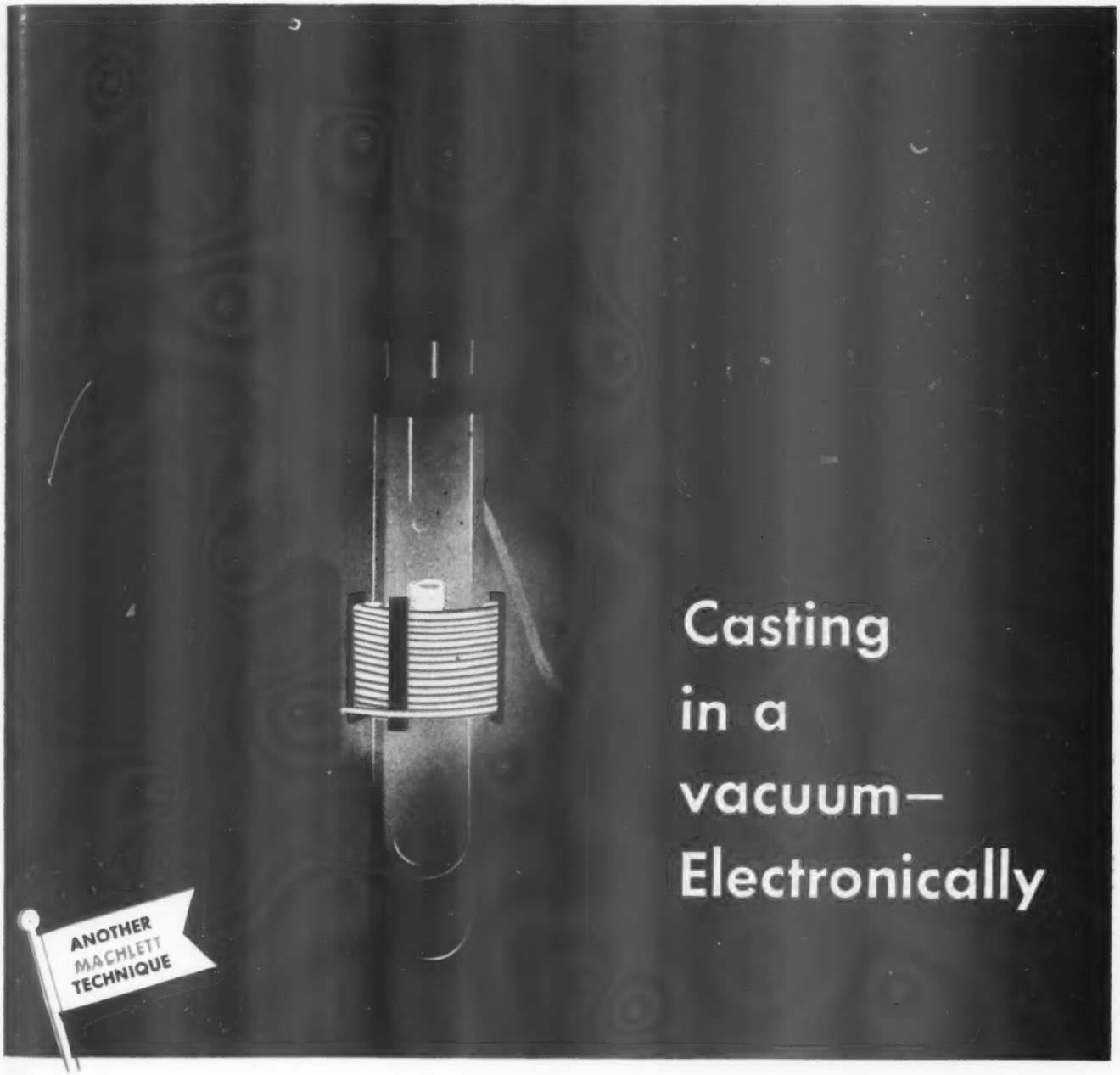
Welder's Cape: Eastern Equipment Co., Willow Grove, Pa., is offering a garment designed to give full protection to welders when welding in any position. Made of chrome leather, it incorporates underarm flaps and a collar which may be turned up and held securely in an upright position. The design provides freedom of movement and ventilation. Snap fasteners permit easy removal of the bib front.

Air Strainer: Inco Engineering Co., 200 Third Street N.E., Cedar Rapids, Iowa, is offering a line of water traps designed to remove a high percentage of water condensate, oil and dirt, and to

provide clean, dry air to equipment. It operates on the principle of high velocity impingement on a cold surface in three stages. Maximum working pressure is 125 pounds. Of all-steel, electric welded construction, the standard unit has an overall height of 46¾ inches and weighs 55 pounds. Larger sizes are obtainable.

Welding Goggle: American Optical Co., Southbridge, Mass., is offering a new improved welding goggle said to provide better protection and greater comfort for the wearer. Eyecups, anatomically molded for the right and left eye, have larger, more comfortable edges, rounded to fit flush against the contour of the face. Eyecups also are shallow but with deep sides. Improved nasal fitting likewise adds to comfort and safety. Newly designed side shields provide greatly increased ventilation to keep eyes cool and to help prevent lens fogging. New style louvers make it impossible for stray light rays or sparks to reach the eyes. The one-piece headband resists perspiration, oil and water, and the ball-chain bridge, covered with curved plastic tub-

(*Continued on page* 160)

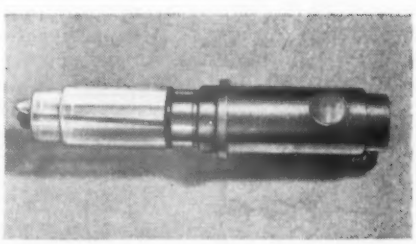


Casting in a vacuum—Electronically

One of the many vital processes that give Machlett vacuum tubes their remarkable quality is a novel method of casting electrodes in a vacuum. Anodes for X-ray tubes, and complex parts of high-frequency oscillators are made by this unusual technique. Purified copper rod is placed over a mould in a graphite crucible, and the whole enclosed within a double-walled water-cooled quartz-silicon tube, which is encircled by a high-frequency coil. A vacuum of about 10^{-5} mm. of mercury is maintained.

When the current is turned on, the metal melts and flows into the mould. Cooling is precisely controlled by adjusting the position of the heating coil, so that crystals form longitudinally, for maximum heat transfer under operating conditions.

This method accomplishes a number of things, quickly and simply. No gases can be occluded in the metal to shorten tube life by reducing the vacuum. Oxides cannot form. There are no "pipes" in a casting thus poured. Dimensions can be held to about 1/10,000th of an inch—and accurate dimensions are as important as metal purity in protecting tube performance, both assuring the maximum designed performance and long life. This method of casting electronically is but one of our processes that assure quality . . . Machlett Laboratories, Inc., Springdale, Connecticut.

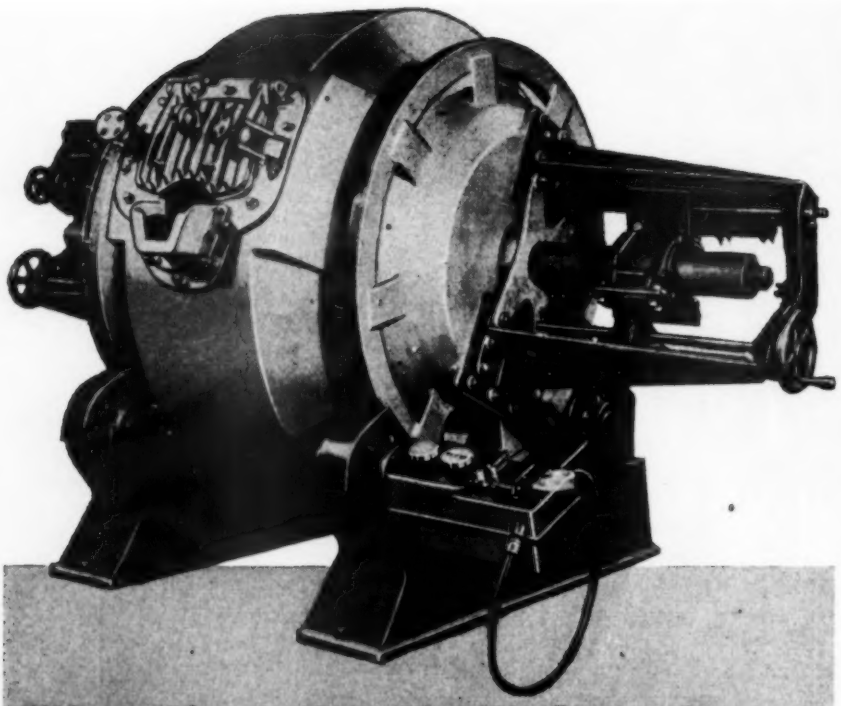


EG-50—an X-ray tube with beryllium window for radiography of light materials and thin sections.

MACHLETT

X RAY TUBES SINCE 1898

TODAY THEIR LARGEST MAKER



What they say about Detroit Rocking Electric Furnaces

Workmen who operate them, swear by Detroit Rocking Electric Furnaces. And for good reason. There are no products of combustion; and since melting takes place in a closed chamber, dirt and fumes are reduced to a minimum. Easy to operate, each heat is poured with the least amount of hard work.

Metallurgists are well sold on Detroit Furnaces. Because of their automatic stiring action under non oxidizing conditions and their precise control of time, temperature and composition, these efficient units assure superior metallurgical results.

Managers of foundries who know them, fully appreciate the advantages of Detroit Rocking Electric Furnaces. They insure faster melting, lower metal losses, and less machine-shop scrap. Detroit Furnaces melt more pounds per man hour. They give a higher percentage of perfect castings of uniform quality. They melt as many as 8 ferrous or 16 non ferrous heats in one eight-hour day.

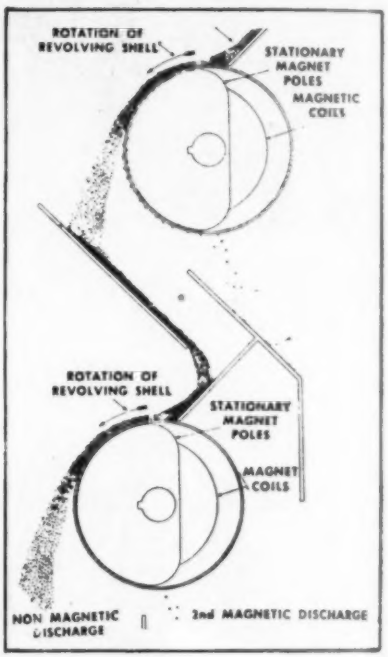
From every view point, a Detroit Rocking Electric Furnace is the outstanding foundry melting unit.

DETROIT ELECTRIC FURNACE DIVISION
KUHLMAN ELECTRIC COMPANY • BAY CITY, MICHIGAN

(*Continued from page* 158)

ing which fits snugly over the bridge of the nose, can be adjusted quickly and easily. The goggles are available with various types and shades of lenses.

Scrap Separator: Dings Magnetic Separator Co., 509 East Smith Street, Milwaukee 7, announces an improved, double drum, high intensity magnetic separator for separating ferrous and nonferrous scrap. Principle of operation is indicated in the illustration. New features include high temperature windings on the coils, which are capable of withstanding extremely hot aluminum



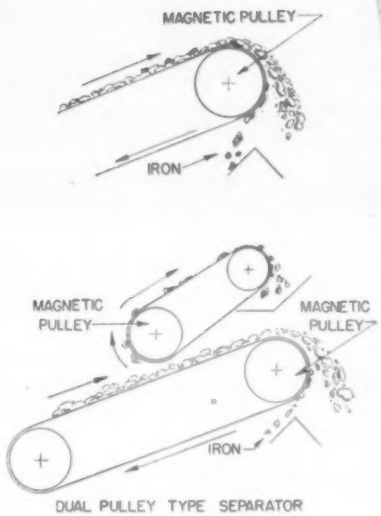
chips. Outboard bearings on the drum shafts are easily inspected. Either drum can be removed without dismantling the entire separator. All bearings are dust-sealed, antifriction type, and lubrication is provided by a new pressure feed system. Capacity of the 24-inch width model is about 5000 pounds of aluminum borings per hour.

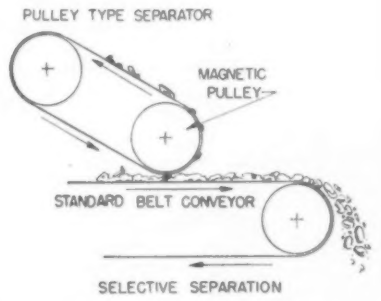
Plant Broadcaster: Executone Corp., 415 Lexington Avenue, New York 17, has developed a new baffle type reproducer unit in its voice paging and industrial music systems to provide duo-directional high fidelity reproduction of both voice and music for plant broadcasting. It is recommended for wide-angle coverage of medium and low noise level areas. Use of several such units, properly spaced in large production areas, helps to overcome uneven sound distribution.

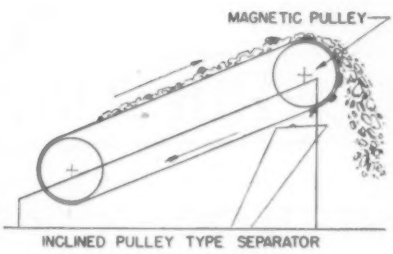
Heat Resisting Paint: Quigley Co. Inc., 527 Fifth Avenue, New York 17, is offering a paint for application to surfaces subjected to high heat and for which maximum protection and decoration are desired. For normal interior conditions it is ready for service

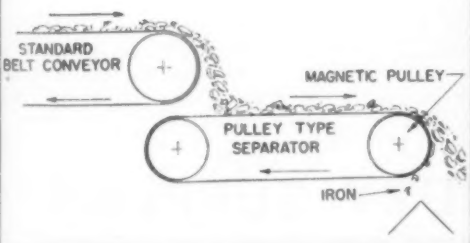
(*Continued on page* 163)

DINGS MAGNETIC PULLEYS









. . . offer broad application possibilities in the metal working industries

● The diagrams at the left represent typical installations of Dings High Intensity Magnetic Pulleys for automatically removing iron from foundry sand, slag, non-ferrous scrap and other substances. No matter what your requirements or existing materials handling system, Dings engineers can help you adapt a pulley or other Dings Separator to the job.

Write for details and ask for Pulley Catalog No. 250

ALNICO TEST MAGNET

NEW! Alnico horseshoe magnet for laboratories, smelters, refiners, etc. Measurers 2½" high x 3" wide. Pole bases ¾" x ¾". Very powerful. Prices on request.

Dings MAGNETIC SEPARATION HIGH INTENSITY

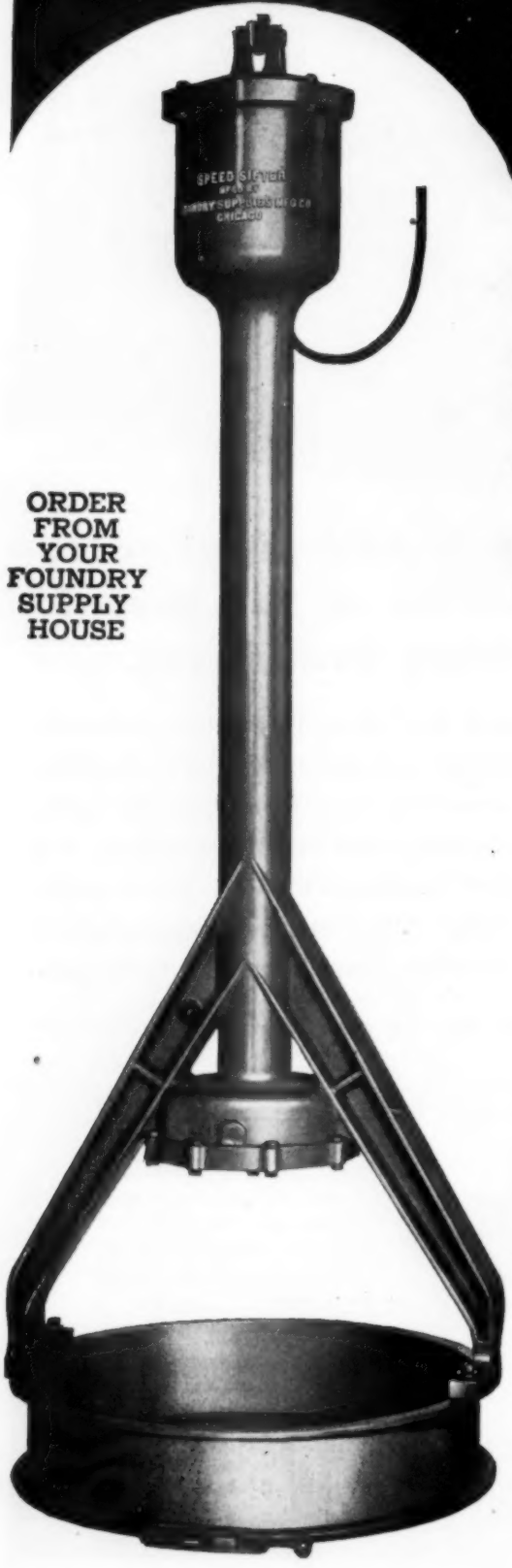
World's Largest Exclusive Builders of Magnetic Equipment

DINGS MAGNETIC SEPARATOR CO.

512 E. Smith St. ● Milwaukee 7, Wisconsin

Increase Production with
ROTOPLANE Speed Sifters

"Hard-to-Please" Foundries Standardize on Rotoplane!



ORDER FROM YOUR FOUNDRY SUPPLY HOUSE

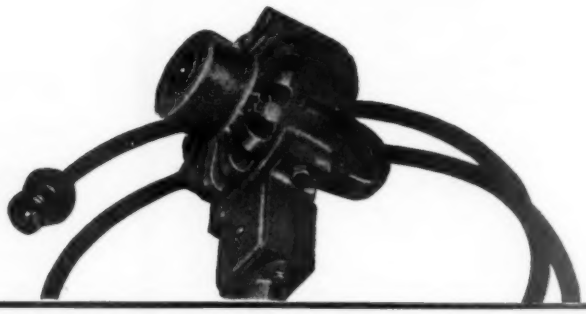
Try ROTOPLANE in your plant. You, too, will find it increases production, does *all* your sifting more quickly and economically. One size and type for all sifting jobs.

ROTOPLANE is built for long, dependable service. Strong, one-piece frame gives remarkably effective vibration. Smooth, free, rotary action. All mechanism completely enclosed and dustproof. Weight approx. 90 lbs., 62 in. high overall.

Steel-mounted sieves instantly interchangeable. No jagged screen edges, no storage problem. 20 in. diameter clear sifting area.

TEN DAYS FREE TRIAL.

$175.00 f.o.b. Chicago—complete with cable, safety ground wire, one sieve (2-4 mesh). Standard ⅓ h.p. motor, 115-230 volts 60 cycle single phase. Prices with other motors quoted on request.



ELECTRIC VIBRATORS

True-to-pattern castings make satisfied customers . . . more repeat business. Increase your production and castings quality with RED Electric Vibrators. Sturdy, dustproof, lowest operating cost (electricity does not freeze). Unequaled for consistent year-'round results in foundries all over the world.

(All Prices f.o.b. Chicago)

No. 1—Light match plate work	$10.00	No. 5—Heavy match plate, tub, bench	$17.00
No. 2—Medium match plate	13.00	No. 9—Machine and heavier	24.00

FOUNDRY SUPPLIES MANUFACTURING CO.

2221 Orchard Street — Chicago, Illinois

CABLE ADDRESS: "ROTOPLANE CHICAGO"

(*Continued from page* 160)

after application and air drying, but for extremely wet interiors it must be heated to at least 300 degrees Fahr. after application. It can be sprayed on hot surfaces where a shutdown is inconvenient. For exterior use it must be heated to 500 degrees Fahr. after it is applied to a metal surface, although on continuously hot surfaces no heat treatment of the paint film is necessary either on interior or exterior exposed surfaces. Heat resistance depends on the material painted; on light steel it is said to adhere up to 1400 degrees Fahr., and on alloy steel, brick, etc., up to 2500 degrees or over.

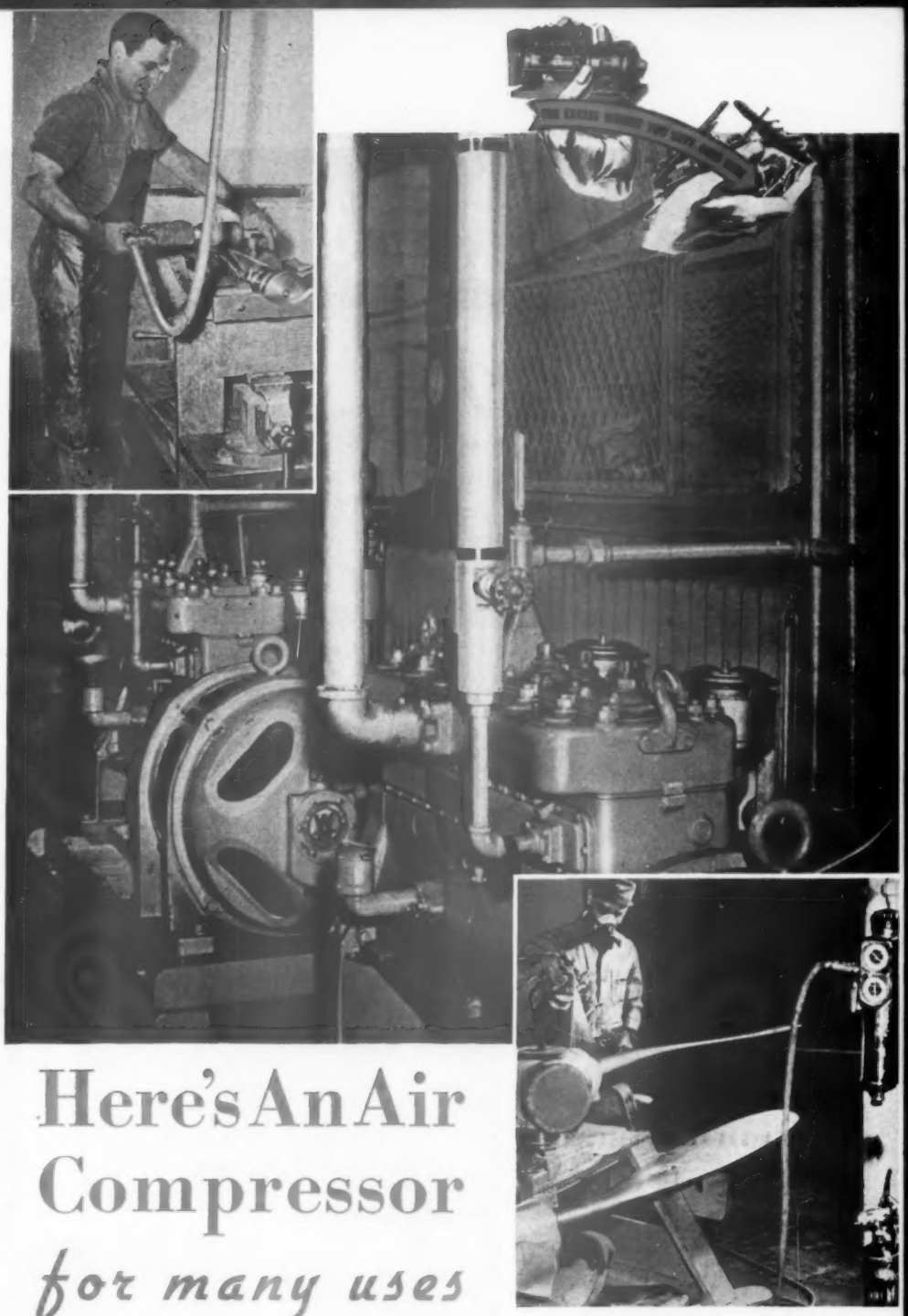
Cast Tool Steel: Jessop Steel Co., Washington, Pa., now is equipped to provide tool steels cast to shape for commercial applications such as dies, forming tools, glass molds, gages, gears, etc. Principal advantages of their use are savings in time, labor, material and

machining costs. All castings are furnished in the annealed condition to facilitate machining. Standard types of tool steel are offered in air hardening, oil hardening, flame hardening, stainless and heat resistant analyses, with other analyses of specialty steels available.

Truck Battery: Philco Corp., Trenton 7, N. J., announces a new industrial truck storage battery said to have 30 per cent longer life and to incorporate a new principle of fabricated glass tape insulation. Glass mats have been replaced by a jacket of glass tape which completely encases the positive plates. The tape is wrapped in a double layer, one horizontal and the other vertical, both with ample overlap to assure a homogeneous film. Until wartime restrictions are lifted, the battery is available in only certain sizes and limited quantities.

Descaling Nozzle: Victor Equipment Co., 844 Folsom Street, San Francisco, has introduced a flame priming and descaling nozzle for attachment to its welding torch butts. It is provided

(*Concluded on page* 166)



Here's An Air Compressor *for many uses*

This illustration shows a Schramm Air Compressor furnishing air for sanding and paint spraying airplane propellers.

Schramm stationary units fit the need for compressors that can do a variety of jobs in industrial and power plants.

Check these uses to which you can put Schramm in your plant: operating milling and drilling machines . . . chipping and calking hammers . . . cleaning engines and generators . . . sand blasting grooving bearings . . . cleaning boiler flues . . . and every other pneumatic tool requirement. Write today for latest bulletin.

SCHRAMM INC.
THE COMPRESSOR PEOPLE
WEST CHESTER
PENNSYLVANIA

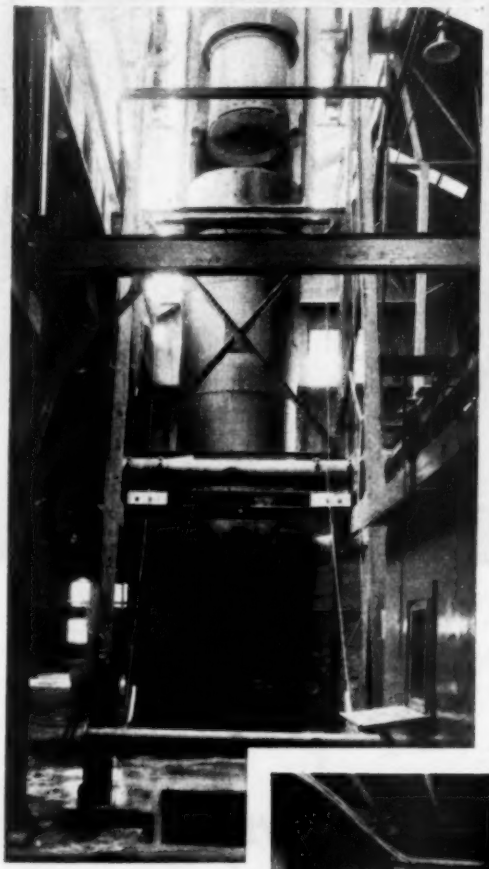
MECHANIZATION *is the answer*

WHITING

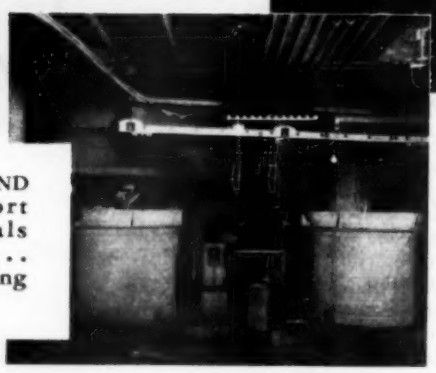
Labor-Saving Equipment for Foundries

Whiting has supplied time- and labor-saving equipment for foundries for nearly sixty years. Its leadership in pioneering and development work has led to the general adoption of many Whiting innovations throughout the industry and is still showing the way to improved foundry practices and techniques.

Let Whiting mechanized equipment take the place of dwindling manpower. With these specially engineered labor-savers, you can maintain production at peak capacity despite losses of men to the army.



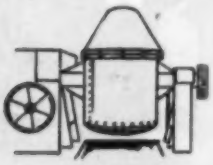
MECHANICAL CHARGING—Foundries using Whiting Mechanical Charging Systems report big reductions in manpower needs. In one case, 21 fewer men are required in the charging crew for two cupolas. In another, 3 operators do the work formerly done by 18.



TRANSFER CARS AND TRUCKS transport charging materials quickly and easily . . . also used in handling finished work.

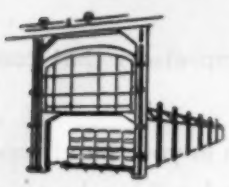
WHITING CHARGING EQUIPMENT is available for all foundries, large or small—inclined and vertical skips, as well as every crane type. Wishbone buckets distribute the charge.

CONVERTERS

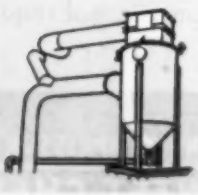


HYDRO-ARC FURNACES

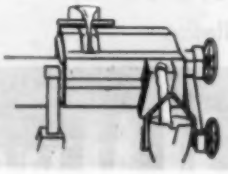
ANNEALING OVENS



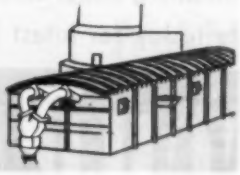
DUST SUPPRESSORS



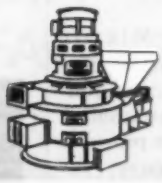
U-LADLES



DUPLEXING

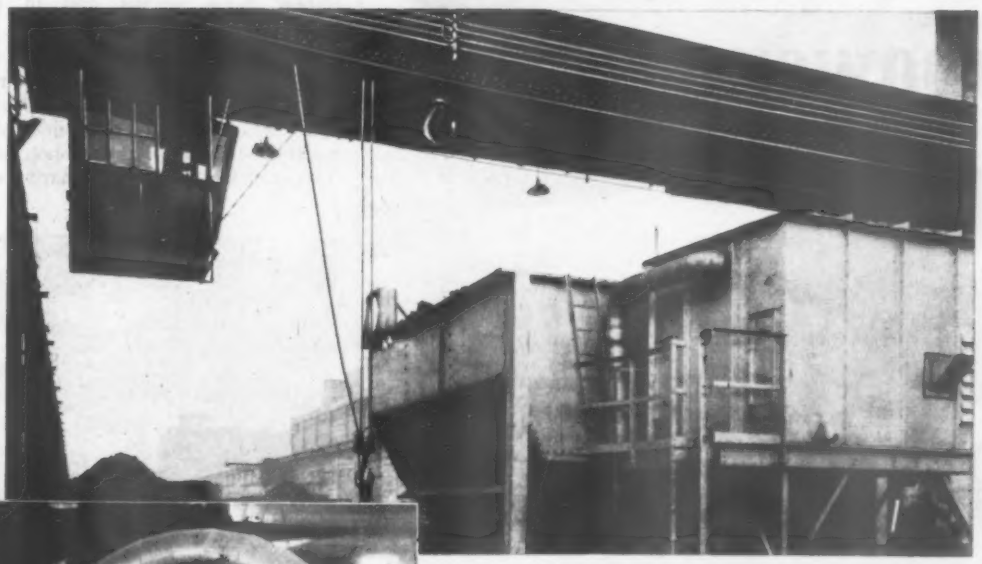


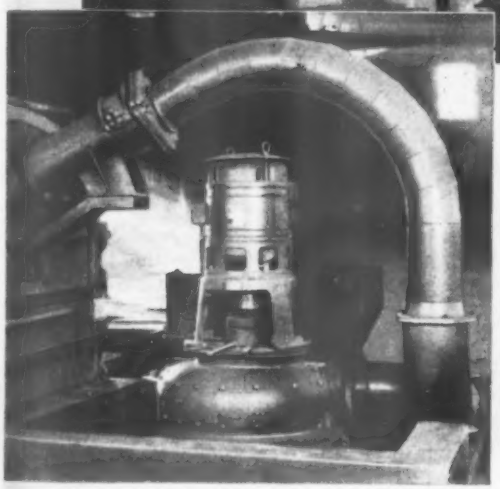
PULVERIZERS



CUPOLA and CHARGER

to Shortages of Manpower





CRANES—Whiting Cranes can save manpower in your materials-handling jobs. Cranes of every size and type are made for foundry use in material yards, charging operations, molding floors, core rooms, cleaning rooms, etc.

PULVERIZERS AND PULVERIZED COAL BURNERS for firing melting furnaces, annealing ovens, boilers, etc. Operation is completely automatic and in some cases it releases as many as three men from a single air furnace.

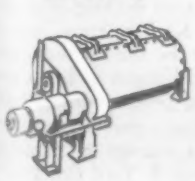
LADLES AND LADLE HANDLERS—Whiting Ladles may be operated with ease and safety. Whiting Ladle Handlers, featuring fingertip raising and lowering devices, permit one man to pour a large number of molds continuously with complete control.

ARMY NAVY

WHITING CORPORATION

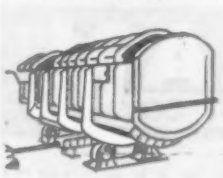
15607 Lathrop Ave., Harvey, Illinois

TUMBLERS

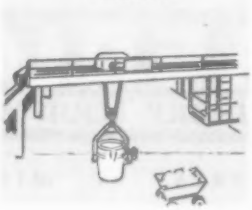


LADLES

CRADLE FURNACES



CRANES



Recently revised booklet of "Practical Hints on Cupola Operation" is available to users of Whiting Cupolas.

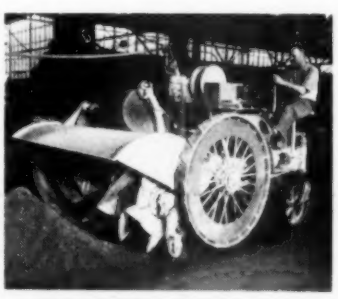
Why Shovel away your Manpower

Manpower is hard to find . . . It represents production hours and plenty of money. Why shovel away your manpower on a sand pile?

With an American Sand Cutter, you can cut a heap in less than one-quarter of the time required by two men with shovels. A heap 30′ long by 60′ wide can be cut through with the Sandcutter in less than two minutes.

The cost is very low. A prominent agricultural machinery plant reports this performance with their Sandcutter: 35 heaps, 5′ x 30′ cut and piled in 2½ hours. Cost including carrying charges, labor, power and maintenance only 15 cents a heap.

Compare this with your own costs of cutting sand by hand. Of course, there's *no* comparison between the quality of the sand—the Sandcutter does the job so much more perfectly. Write for more information now.



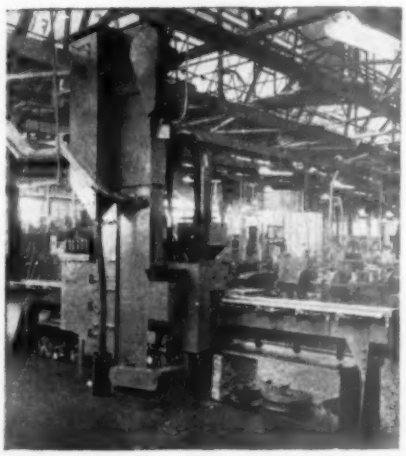
AMERICAN FOUNDRY EQUIPMENT CO.

505 S. BYRKIT STREET • MISHAWAKA, INDIANA

(*Concluded from page* 163)

with a well-designed spiral mixer and gas proportioner for handling the larger gas volumes required in the operations, and which is claimed to eliminate backfire or flashbacks. To keep premixed gases below ignition temperatures an aluminum cooling section is incorporated at the nozzle head. Replaceable skid shoes of processed gray iron add to wearing life. Nozzle is made in 4 and 6-inch ribbon flame widths and in special circular, multiflame type.

Shot Peening: American Foundry Equipment Co., Mishawaka, Ind., announces a line of machines for treating stressed parts by shot peening. This cold working of such parts as gears,



springs, torsion bars, crankshafts, etc., increases their life by putting the surface layers in a state of residual compression. With the machine illustrated, torsion bars are placed on skewed-dished rollers and conveyed through the unit while rotating so that all surfaces are exposed to shot hurled by the airless, centrifugal blast mechanism. Other models are available to give different combinations of motion for peening parts of various shapes and sizes.

Acme Pattern, Tool Changes Name

Acme Pattern & Tool Co., Dayton, O., has changed its corporate name to Acme Aluminum Alloys Inc. The new name was adopted because of the sharp growth in the company's production of aluminum castings. The Acme foundry is said to be among the four or five largest in the United States.

This is the second time that Acme has outgrown its name. The original company, Acme Pattern & Mfg. Co., organized in 1920 by Karl A. Stein, was at first engaged solely in the manufacture of patterns. Later additions of brass and aluminum foundries, production of tools and dies, and a design and engineering division prompted a change in name in 1933 to Acme Pattern & Tool Co. Inc.

Now Available

TO EVERY FOUNDRY

MAINTAINS PERMEABILITY

INCREASES PERMEABILITY

MINCO BOND

. . . IN THE LARGEST FOUNDRY IN THE WORLD MINCO BOND REDUCED SCRAP LOSSES OVER 50%

In tests conducted at the River Rouge Plant of Ford Motor Company, running three eight hour shifts continuously over a period of ten weeks, on systems J-1, J-2, I-1, I-2, the use of MINCO BOND reduced their scrap losses from an average of 2.8% to an average of 1.3%. It increased the permeability on these systems from approximately 60 to well above 85. On the so-called "pump job" on system J-2, the use of MINCO BOND reduced the LEAKER count from approximately 400 to approximately 16.

In the largest foundry in Cleveland the use of MINCO BOND has increased their permeability from approximately 40 to well over 80 and it is being maintained there.

The use of MINCO BOND brings synthetic sand to the jobbing foundries and floor shops of America. Burned out sand is your best sand, if you rebond it with MINCO BOND.

MINCO BOND is a practically neutral mineral, having a pH of approximately 7.5. Because of this it can be used over and over again in foundry heaps and systems year after year with uniformly excellent results.

MINCO BOND increases flowability and eliminates casting blows.

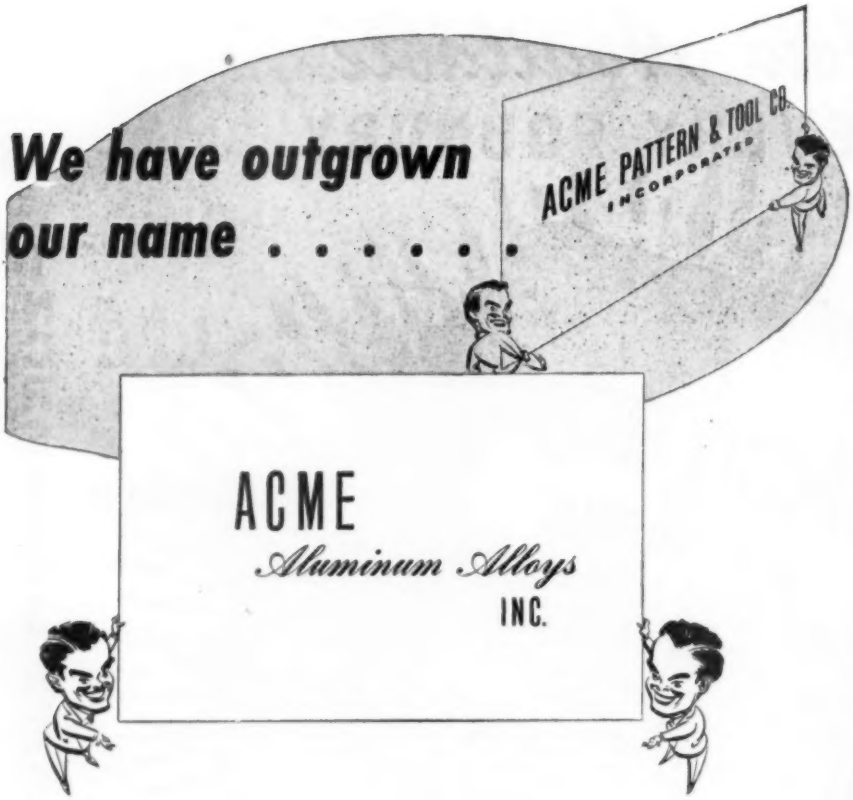
It is easy to bond your molding sand heaps or systems with MINCO BOND, but if you wish, one of our Foundry Engineers will gladly get you started at no expense to you.

MINCO PRODUCTS CORPORATION
SAGINAW, MICHIGAN

WARNER R. THOMPSON CO.
7328 Hamilton Ave., Detroit, Mich.

HOFFMAN FOUNDRY SUPPLY CO.
1193 Main, Cleveland, Ohio

THE BUCKEYE PRODUCTS CO.
7020-34 Vine Street, Cincinnati, Ohio



BECAUSE the name Acme Pattern & Tool Company, Inc. no longer adequately describes the scope of our operations, we are changing our corporate name to Acme Aluminum Alloys, Inc.

This marks the second time we have changed our name to keep pace with the remarkable growth which this company has made since its beginning less than 25 years ago.

Our production of aluminum alloy castings . . . permanent mold and sand . . . has grown to such volume, that in floor space, equipment and output the Acme foundry today ranks among the first four or five aluminum foundries in the United States.

Our pattern, tool and die departments, and our design and engineering service, continue unchanged, but will operate as the Acme Pattern & Tool Division of Acme Aluminum Alloys, Inc.

We shall be glad to submit recommendations and estimates on your current or future aluminum castings requirements.

ACME Aluminum Alloys, Inc.
DAYTON 3, OHIO
HEAT-TREATED ALUMINUM ALLOY CASTINGS

ACME PATTERN & TOOL DIVISION
PATTERNS • TOOLS • TOOL DESIGNING
PRODUCTION PROCESSING

FOR VICTORY BUY WAR BONDS AND STAMPS

How Much Is The Job Worth?

(*Continued from page* 131)

hour? Why does that one pay only 70, while a third one pays only 65? What facts should and do cause these differences? A job evaluation study is designed to answer such questions as these.

The dissatisfaction evidenced by workers over wage inequalities, the extension of wage negotiations in collective bargaining, and government regulation of wages have led an increasing number of foundries to rationalize their wage and salary structures. Today's circumstances require wage rate structures which are defensible.

A job evaluation plan, to be satisfactory, must be equitable, fit local conditions and be understandable to employes. It should permit comparisons of job requirements and rates as directly as possible, not through use of technical terms understood only by experts.

A defensible method of job evaluation means a plan which will measure the relative values of jobs so that the rate for each one will be in proper relation to the others, taking into consideration the differences in mental, skill and physical requirements; the responsibilities; and the working conditions for each job.

Gives Job Details

Let us consider as a simple example, the work of a trucker who is trucking cartons from a storage pile to a waiting railroad car. This work has some mental requirements in that the trucker must count the number of cartons, must compare the shipping order against the consignee labels and must check the brand of goods within the cartons. His work further involves certain skills such as lifting the cartons from the pile to the truck, in trucking, and in correctly repiling in the railroad car. Certainly, too, there are high physical requirements in a job of this kind. Moreover, there are responsibilities in the way the cartons are handled so that they will not be damaged, in the correct preparation of shipping records, in the care of the truck, etc. Finally, the working conditions under which the job is performed must be taken into account. In the winter the job is subject to extreme cold; in summer to extreme heat. The shipping room is noisy and at times congested. There are certain hazards to which the work is subject, such as muscular strain and damage to feet. Here are five distinct aspects of one job.

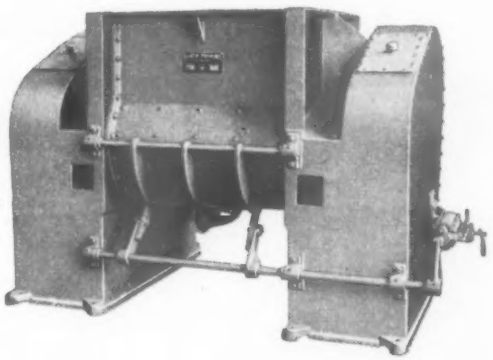
The management of a midwest foundry, having decided that the need for a job evaluation study existed in its plant, called in a firm of engineers. Before undertaking the work, plans were laid as to procedure, and definitions of terminology were established. The order of procedure included the designation of those who were to do the analysis work, and priority in taking up the respective departments.

If the full value of job evaluation is

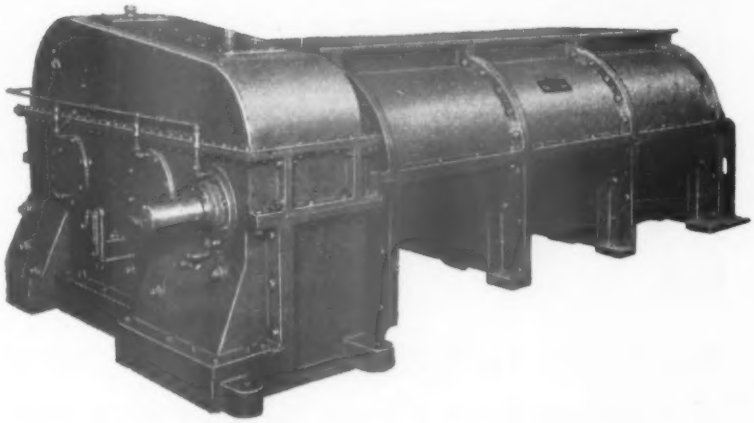
(*Continued on page* 170)

Increase your foundry's efficiency with Baker Perkins equipment

Baker Perkins "Unidor" Core Sand Mixers improve castings and reduce spoilage by improving the character of core sand. Adaptable to, or available with, an air or electrically operated skip hoist, Baker Perkins mixers rub, stir and knead, all in one operation and do not require special aerating attachments. They distribute uniformly a thin layer of bond around each of the sand grains so that you get 100% benefit from the bonds, binders, oils, sea-coal, pitch or other compounds that you use. And because the silica grains are not broken up, the mixed sand has a high degree of permeability.

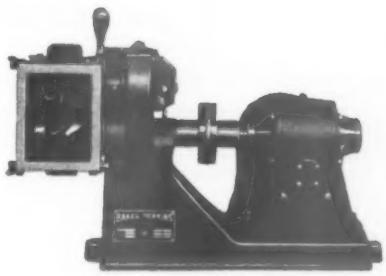


B-P Continuous Mullers are ideal for throughly and rapidly mixing and tempering moulding sands in big production foundries. Because of the unique blade arrangement the thumbling mass is thoroughly aerated and each grain is coated with the correct proportion of bond. Castings from molds made from sand which has been mulled in a B-P muller have a smooth finish, and help assure a minimum of rejected castings. B-P Continuous Mullers deliver 40 to 120 tons of sand per hour in a continuous, uninterrupted flow and require practically no attention whatsoever.



Baker Perkins Liquid Meters automatically and accurately control and measure the amount of binder oil or water flowing directly to each mixer. Once you set the electrically illuminated dials, you can count on the meter giving exactly the amount of liquid you desire. Only two simple pipe connections and a plug-in to a standard 110 volt, 60 cycle circuit are required. Available in capacities to handle up to 600 lbs. Hand or automatically set.

Baker Perkins Laboratory Core Sand Mixers are the ideal units for plants where the exact condition of the sands and bonds are constantly tested. Capacity 1500 to 2000 grams. Any mixing done in this unit can be duplicated on a production basis in the large B-P Foundry Mixers. B-P Laboratory Core Sand Mixers can help you improve your technical knowledge of foundry practice and help you produce better, more uniform castings with less rejects.



Baker Perkins Inc.

FOUNDRY EQUIPMENT SALES • SAGINAW, MICHIGAN

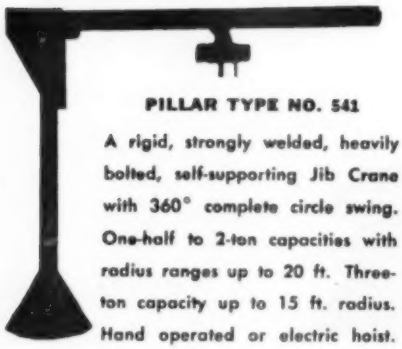
Save WITH JIB CRANES

on Point-of-Operation Jobs . . .

Stop Costly Tie-Ups of Heavy-Duty Overhead Cranes at Lighter-Duty Points of Foundry Operation!

★ Above view shows a one-man Jib Crane in action loading castings onto the rack of a heat-treating oven at a large ordnance steel plant.

Here, as in dozens of other point-of-operation jobs in the foundry, these Chicago Tramrail Jib Cranes are able to take over loads ranging from 1/2 to 3 tons, thereby releasing the overhead crane for its usually more productive heavy duty handling.



PILLAR TYPE NO. 541

A rigid, strongly welded, heavily bolted, self-supporting Jib Crane with 360° complete circle swing. One-half to 2-ton capacities with radius ranges up to 20 ft. Three-ton capacity up to 15 ft. radius. Hand operated or electric hoist.

for example:

at the "SHAKE-OUT"...

Operating at 360° complete circle swing, these nimble cranes take the load from overhead cranes which converge at the "shake-out". No costly tie-up or wear and tear of heavy duty equipment and you save man-power in the bargain.

Write today for Jib Crane circular. No obligation.

CHICAGO TRAMRAIL COMPANY

2910 CARROLL AVE. Phone KEDzie 7475 CHICAGO, ILL.

(*Continued from page* 168)

to be realized, employes must be taken into management's confidence and should participate in the plans and procedures. Therefore a statement of the aims of the work, was prepared for the information of the employes. Department heads and foremen were told about the work, in a series of meetings.

Each analyst was supplied with "Instructions to Job Analysts" and definitions of terminology. The definitions were also valuable to the job evaluation committees. Such terms as skill or responsibilities had to be clearly defined and properly used; otherwise, what one person considered as a skill another might consider as a mental requirement and some one else might consider a responsibility. The job analysis record and job specification form were prepared before the analysts began work.

First step was to make a careful analysis of each distinct job in the foundry. The analyst interviewed the employes at their work stations, recording in detail on the job analysis record the education and trade knowledge required; the kind of skill involved and the time necessary to acquire it; kinds and amounts of physical effort; responsibilities for machinery, materials or the work of others; and the conditions under which the employe was required to work.

Approach Is Important

The interviewer's approach was friendly and the contact pleasant. The employe saw the notes the analyst made, had opportunity to amend them, and to call attention to anything he considered important about his job. The employe always was thanked for his co-operation. Based on the data gathered in the interviews with the workers, the job analysts prepared a specification (Fig. 1) for each job studied.

The contents of the specification included much of the same information contained in the job analysis record, but in different arrangement, according to the five comparison factors:

1. Mental requirements
2. Skill requirements
3. Physical requirements
4. Responsibilities
5. Working conditions

All job specifications were approved by the immediate supervisors before being used in evaluating work. Sufficient copies were then made so that each committee member had a complete set of specifications.

The key scale is the heart of the factor comparison method—it is the measuring stick for each factor; the evaluated rate for a job is merely the sum of the five factors valued.

In making such a comparison scale, the problem is to select a few representative jobs which are in proper relation to one another and to appraise each factor of each selected job, as in Fig. 2.

Some jobs obviously were unsuited for possible inclusion in such a scale. After considerable analysis and discussion,

(*Continued on page* 172)

What ROSS Has Done For Aluminum and Magnesium

Reproduced from advertisements featuring ROSS advanced oven designs for Aluminum and Magnesium foundries.

can be done to benefit the

GRAY IRON FOUNDRY

Solving the new production problems presented by the introduction of light weight metals has resulted in major advances in former methods for baking and treating that are proving profitable for the Gray Iron foundries as well.

Recent ROSS developments in zone heating, control and uniformity of temperatures, and air distribution, have made possible new standards of capacity, quality and quantity of output that will prove highly advantageous in the production of gray iron castings.

New improved design, construction and operating features are available in ROSS Ovens of continuous, compartment or stationary types — for every step in processing from the core to the finished casting. Consider them in your plans for post-war production.

Consult Us On Your Foundry Ventilation Problems.

Proper foundry ventilation need no longer prove a problem in maintaining working comfort and efficiency. ROSS engineers, with a background of 25 years experience in this field, will gladly explain the most modern methods for providing ideal conditions.

ROSS SYSTEMS

J.O.ROSS ENGINEERING CORP.

350 MADISON AVE., New York 17, N. Y.

CHICAGO – 6
201 North Wells St.

BOSTON – 9
79 Milk St.

DETROIT – 3
12953 Greeley Ave.

ROSS ENGINEERING OF CANADA, LTD., Dominion Square Building, Montreal, P. Q.

CONTROL OF AIR FOR MODERN INDUSTRY

Foundrymen...

America's most modern metallurgical plant brings you a significant **Double Service!**

1-Over 300 alloys for immediate shipment

Niagara Falls Smelting and Refining Corporation provides . . . a selection of alloys suitable for acid resisting castings; rolling mill aids, iron and steel casting aids, pressure casting alloys, pattern aluminums, foundry hardeners, deoxidizers, and fluxes . . . the "know-how" which comes with an annual capacity of over 70,000,000 pounds . . . the advantage of being a conveniently located source for obtaining prompt delivery of extensive quantities of alloys.

Facts for Foundrymen
Alloy Additions to Gray Iron, Malleable and Semi-Steel
Aluminum and its Alloys
The How and Why of Fluxes and the When and How to Use Them in the production of Better Castings
Herbert O. Hayes
Casting Alloys
Their Chemical and Physical Properties

2-Information on all modern techniques for BETTER CASTINGS

Indispensable to foundrymen are these recent booklets containing pointed information on heat treatment, composition and properties of aluminum, copper, tin, lead, zinc, brass, and other metals. Also included are tables of mixtures, S.A.E. specifications, descriptions of many new alloys, and suggestions on how to make better castings.

Write us directly.

NIAGARA FALLS SMELTING & REFINING CORPORATION

BUFFALO 17, N. Y.

(*Continued from page* 170)

some 24 were selected as possible key jobs. A committee of five consisting of two department heads, a pattern maker, a cupola tender, and a consulting management engineer then ranked these 24 jobs, first, as to mental effort, second as to skill, then as to physical effort, responsibility and working conditions, putting in first rank the job which required the greatest degree of the factor under consideration. The rankings of the different committee members were averaged, after comparisons had been made and members had been given opportunity to change their rankings following discussion.

After average rankings had been computed, each member of the committee determined what portion of the present rate for each job he considered was being paid for each factor. Thus, for a pot pusher being paid at the rate of 70 cents per hour, a member might make an apportionment as follows:

Mental effort	$0.07
Skill	0.08
Physical effort	0.28
Responsibility	0.07
Working conditions	0.20
Total	$0.70

The ratings of the members for each factor then were averaged.

Next, comparison was made between the position of a job in each factor on the ranking sheet and the position of the same job in each factor on the money value apportionment. Obviously, the job which ranked highest in skill should also be the job for which the committee apportioned the highest money value for skill, the one which ranked second should be the one to which the second highest amount of money was apportioned, and the one which ranked lowest should also be lowest in money value for that factor.

Make Comparison Scale

However, it was found that some jobs carried rates too large to permit a spread which would place them in proper rank; others were being paid too little. Jobs with rates which resulted in the greatest discrepancies between factor rank and money rank were eliminated and the process was repeated with the remaining ones. At last ten jobs remained, each of them with factor money values corresponding to its rank positions for the five factors. These ten were listed on the job factor comparison scale in the style shown in Fig. 2. This scale became the measuring stick by means of which the different factors in all other jobs were evaluated.

To evaluate a job, each member of the committee was given a copy of the scale and specifications for all the jobs on it, together with specifications for the jobs to be evaluated. After reading the entire specification of a job to be valued, the member concentrated his attention on the items in the mental effort column. He considered whether the mental requirements were equal to, greater than, or less than those of a pattern maker,

(*Continued on page* 174)

Air, controlled and at work puts the "sock" in a windsock. Compressed air, Schrader-controlled, puts a "sock" into industrial operations, makes shorter, easier, safer work of them.

Schrader Air Controls cut costs, save time and labor by reducing or eliminating tiring and hazardous muscular operations. Using thrifty controlled intermittent air blasts instead of wasteful continuous flow, Schrader controls also enable you to enjoy the advantages of Schrader devices without—in many cases—adding to your existing compressor capacity.

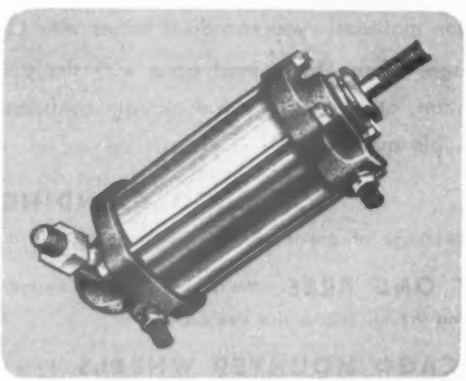
The first cost of Schrader Air Controls and devices is so small and the return on the investment so consistently high that you can hardly afford to risk a return to reconversion production schedules and costs without serious consideration of them.

A highly practical example of Schrader air devices is the Schrader Air Cylinder, an air "muscle" with a thousand uses. Schrader Air Cylinders do tough, tiring, lifting, lowering, pushing or pulling jobs better, faster and cheaper than they can be done manually.

Send for the new Air Cylinder Bulletin A-10Q and see the many Cylinders, Operating Valves, etc., you can use to save the time and energy of your workers.

Air Valves 2, 3, 4-way • Blow Guns • Machine Operating Air Controls • Quick-acting Couplers • Safety Operating Controls • Air Ejection Sets • Hydraulic Gauges

MADE BY THE MAKERS OF SCHRADER TIRE VALVES AND GAUGES



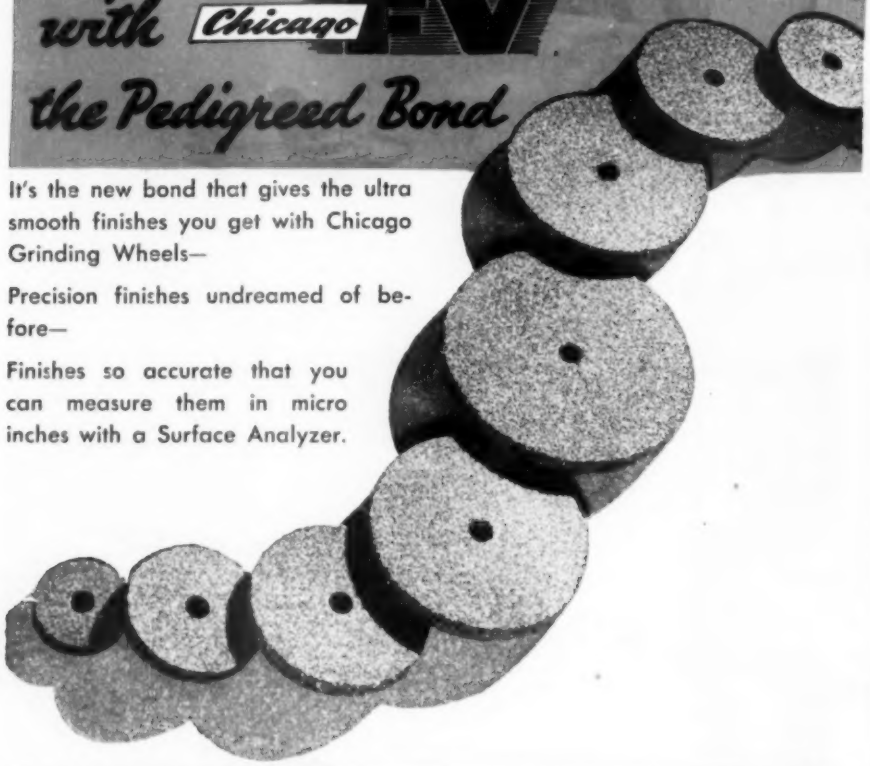
THERE ARE HUNDREDS OF USES for Schrader Air Cylinders. Cost very little. Easy to install and operate with Schrader Control Valves. Many types, single or double-acting, and in a variety of lengths, diameters and mountings for every purpose.

Schrader
REG. U.S. PAT. OFF.
CONTROLS THE AIR

A. SCHRADER'S SON, *Division of Scovill Manufacturing Company, Incorporated,* **BROOKLYN, NEW YORK**

BONDED

with Chicago FV the Pedigreed Bond



It's the new bond that gives the ultra smooth finishes you get with Chicago Grinding Wheels—

Precision finishes undreamed of before—

Finishes so accurate that you can measure them in micro inches with a Surface Analyzer.

PERFECT FINISH INSURANCE

Whatever you have to finish—metals, alloys, plastics, wood, laminates or composition materials—you can do it better with Chicago Wheels.

Chicago Wheels have kept pace with the precision requirements of our war industries, and you can use them with confidence to finish civilian goods better in double quick time.

CHICAGO GRINDING WHEELS

A wide range of grains and grades and—for the duration—sizes up to 3" in diameter.

TRY ONE FREE We'll send without charge a Mounted Wheel or an FV Bond Grinding Wheel. Tell us size you'd like.

CHICAGO MOUNTED WHEELS

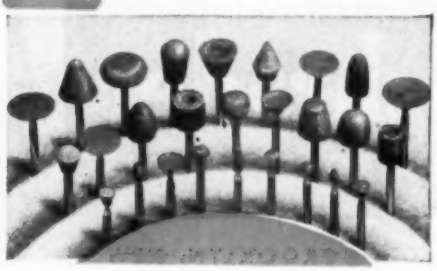
The first made and the finest today. In a selection of bonds, abrasives and shapes to handle each job more efficiently.

Write for Catalog listing all Chicago products and showing comparative photographs of finishes with different kinds of Wheels.

CHICAGO WHEEL & MFG. CO.

Headquarters for Mounted Wheels and Small Grinding Wheels

1101 W. Monroe St., Dept. FD, Chicago 7, Illinois



*Half a Century of Specialization has established our Reputation as the Small Wheel People of the Abrasive Industry.

Send Catalog. Interested in FD-10

☐ Mounted Wheels. ☐ Grinding Wheels.

☐ Send Test Wheel. Size .....

Name .....

Address .....

(*Continued from page* 172)

cupola tender, floor molder, machine molder or other jobs on the scale. He might decide that the mental requirements were greater than those of the floor molder and, therefore, he would rate the job at 28 for mental effort.

From five to ten jobs were rated in each factor before consideration was given to the other factors. Skill, physical effort, responsibility and working conditions were rated in the same manner as mental effort. Each member submitted his rating for entry on a blackboard. He was given opportunity to explain reasons for his rating and to change his rating if discussion showed him that he should. The ratings of the five members were finally averaged for each factor, and the five averages totaled to get the evaluated rate for the job.

The evaluated rate might be higher than, equal to, or lower than the present rate. Theoretically, there should be about as many jobs which evaluate higher than current rates as those which evaluate lower. Actually, it was found that the average of all rates after evaluation, varied only a fraction of one per cent from the average before the evaluation work done.

Put Plan in Operation

After approvals had been received from WLB and Treasury Department to put the evaluation plan in operation, employes were notified regarding the grades into which their positions fell. Also each one was informed as to the maximum and minimum of the particular grade of his particular job. Such information was given to employes individually by their foremen in order that they might know what opportunities were ahead and how they could qualify themselves for promotion or for improvement in their jobs.

Employes below the minima of their grades were brought up to these minima. If the present salary of an employe was other than shown in the normal steps of a job grade, management decided when to bring his wage in line with the step plan.

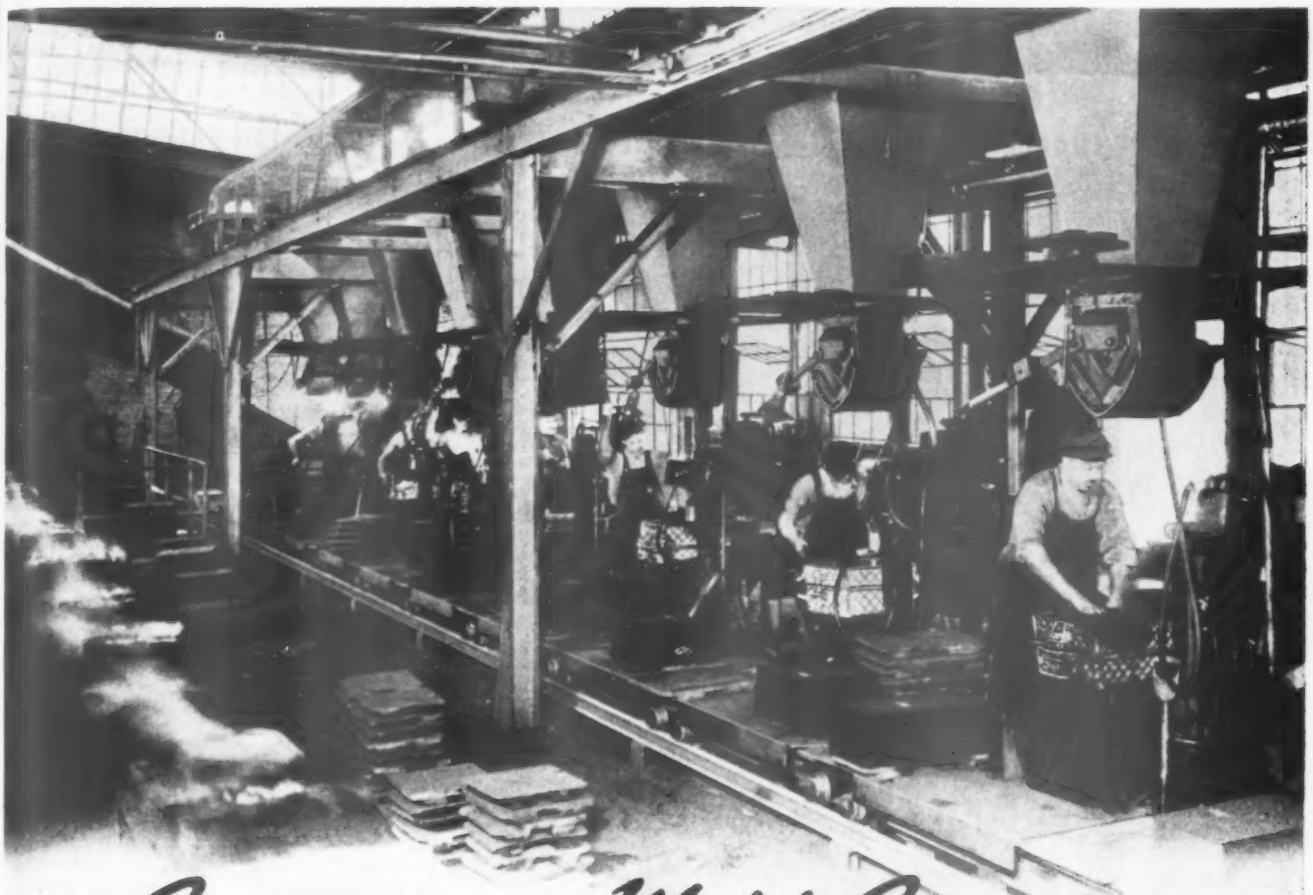
A committee of three was formed to carry on the evaluation work with one member acting as secretary. The secretary's duty was to investigate and prepare material prior to committee discussion, to keep up to date on changes of job content, and to bring such changes to the attention of the committee for revaluation.

In the future, when new jobs must be evaluated or old jobs re-evaluated by reason of a radical change of duties, it will only be necessary that new specifications be written and jobs evaluated by the same basic procedure of factor comparison.

Job analysis is more than the cornerstone of a job evaluation study. Its by-products offer progressive executives the material with which to build an advanced personnel and management procedure.

As has been pointed out frequently, worthwhile employes have a deeper seated

(*Continued on page* 176)



Continuous Mold Conveyors

many types—for every requirement

● Bartlett-Snow Continuous Mold Conveyors provide foundry owners and managers with a means of securing a maximum of both quality and quantity from their plants. They permit sand to be reused three, four or more times a day . . . flasks can be used over again eight to twelve times each shift. Output per given floor space is much increased. "Overhead" is spread over a larger production resulting in a less costly more salable product.

Bartlett-Snow single axle two wheeled cars, and two axle four wheeled cars are available in a wide variety of types and sizes to meet the requirements of handling different kinds and classes of work . . . and the car tops can be fitted with gravity rolls if desired to facilitate the loading and removal of heavy molds.

Our recently completed 40-page Foundry Bulletin No. 91, which illustrates many different applications of "run-around" mold conveyors and other Bartlett-Snow Foundry Equipment, contains much information of interest to every foundryman. Send for a copy!

THE C. O. BARTLETT & SNOW CO.

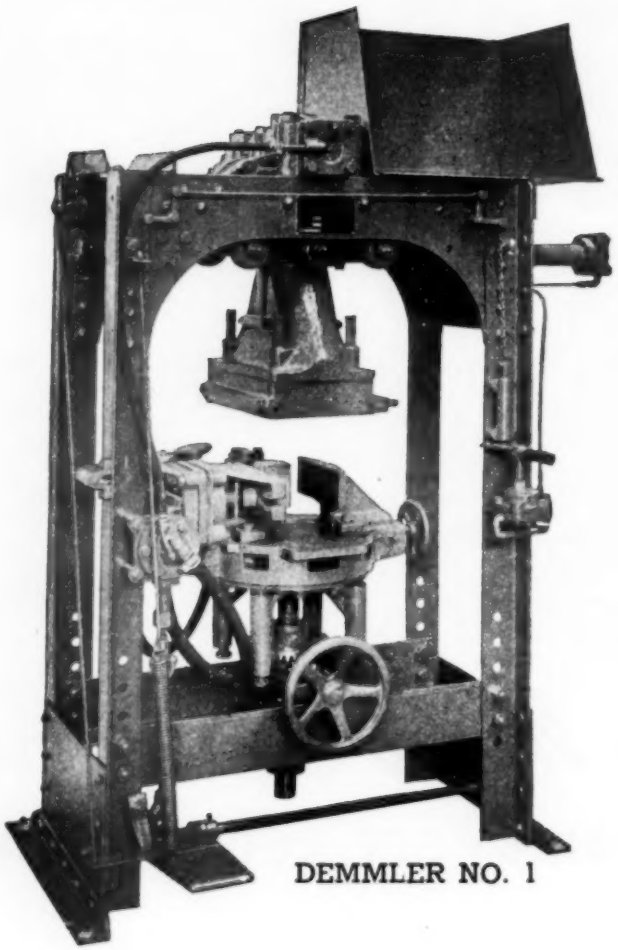
6201 HARVARD AVENUE • CLEVELAND, OHIO

Engineering and Sales Representatives in the Principal Cities

FOUNDRY SAND, MOLD AND CASTINGS HANDLING • • DUST AND FUME CONTROL SYSTEMS • •

★ ★ ★ SINCE 1911 ★ ★ ★

DEPENDABLE **CORE BLOWING** EQUIPMENT



DEMMLER NO. 1

This unit designed especially for small core work such as plumbing goods, electrical fittings, stove burners, valves and small pipe fittings. Ideally suited to quantity core production on all types of small brass, malleable, and gray iron work. Detailed specifications on this or other models on request . . . a type and size for every core blowing need.

WM. DEMMLER & BROS.
KEWANEE, ILLINOIS

CORE BLOWERS *Exclusively*

(*Continued from page* 174)

interest than the pay check. Nearly every new employe is interested not only in the job for which he has been accepted, but in the possibilities for advancement which it offers him. The person who understands what lies ahead does a better piece of work than one kept in the dark. Therefore, using the information secured in the job analysis, management can prepare a chart showing to what other positions a particular job will lead. This chart is similar to an inverted organization chart, for it works up from the bottom rather than down from the top.

It is a truism that the beginning of labor turnover is poor selection. Conversely, good selection will aid in reducing labor turnover. One tool of good selection is an employment test based upon the requirements of a particular job. Information secured in the process of analyzing jobs is sound material upon which to develop suitable tests. Wartime and postwar industrial schedules can not carry square pegs in round holes.

Each grade of castings must meet certain standards. Likewise, the equipment and materials used to produce these finished products must meet predetermined requirements. Therefore, it is not unreasonable to believe that the efficiency of personnel will reach new heights when employes are selected to match job standards. These standards are determined from the specific and accurate data secured in analyzing each job.

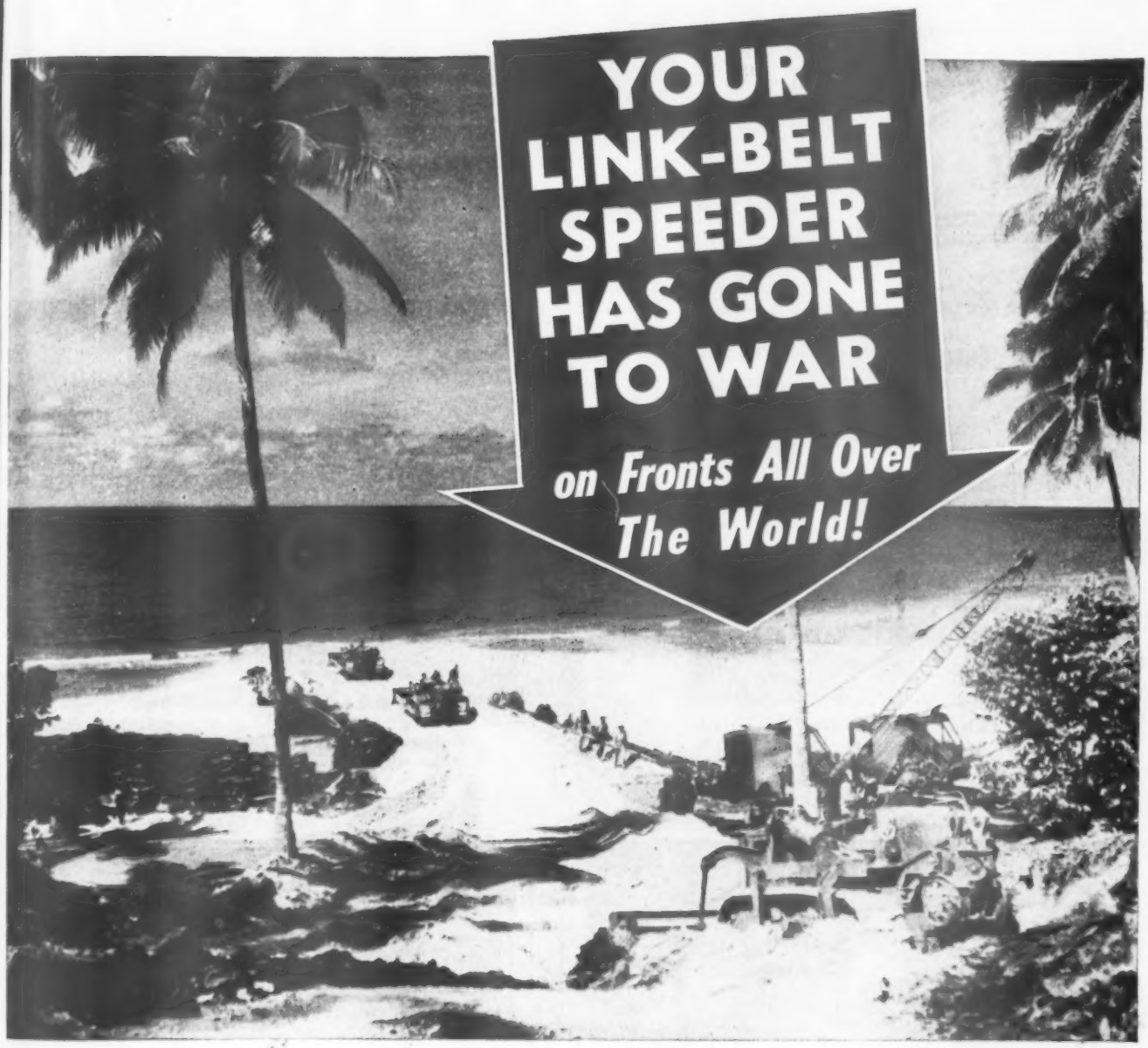
Interviews Are Intelligent

A personnel manager is in a position to conduct intelligent interviews when he possesses accurate job specification. In order to prepare the proper specifications for a certain job the mental and skill requirements, physical factors, responsibilities and supervisory requirements must be taken into consideration. Applicants can be matched against jobs through the use of job specifications.

The value of competent, understanding supervisors or department heads cannot be measured in terms of dollars and cents. The majority of employes judge their company by the intelligence, knowledge and fairness of their foremen. We have found all too often in our morale surveys that workers consider that "the boss" lacks an understanding of the work which he directs and is not aware of the human element in handling his subordinates. In most instances management must bear the responsibility for this condition. The fault may be either poor selection or lack of supervisory training. Job analysis provides a definite guide for the development of a supervisory training program.

It is a well known fact that in most industrial establishments 10 to 20 per cent of the employes are responsible for 75 per cent of the accidents. These accident-prone people are largely maladjusted persons. Some authorities have estimated that compensation costs could be reduced one-half through better adjustment of employes mentally, physically, and emotionally to their jobs. Here also

(*Concluded on page* 180)



• These easy-to-handle, rugged machines can be found on battle fronts all over the globe. Construction battalions everywhere are using them to build landing strips, lay road beds and perform the dozens of other tasks that must be done in order to secure captured territories for further attack on the enemy!

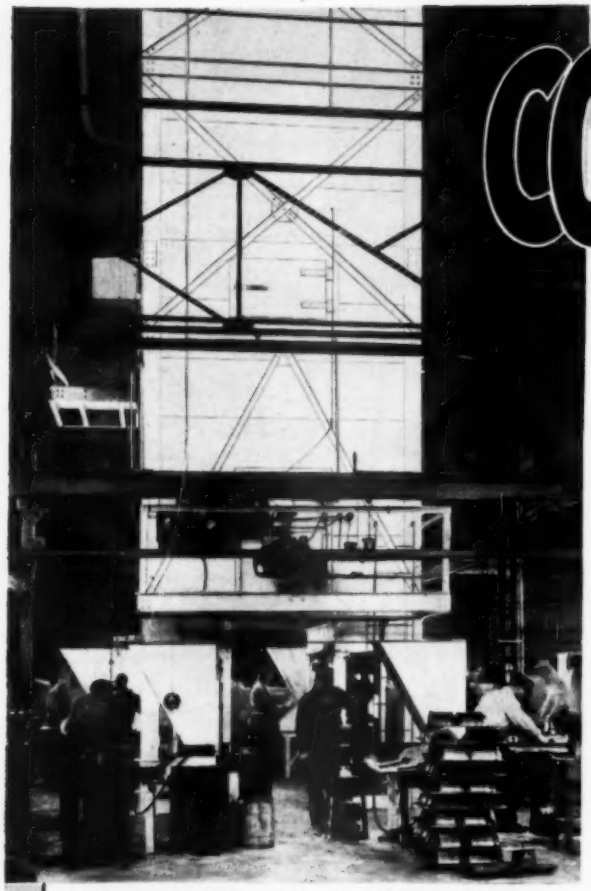
9692

LINK-BELT SPEEDER

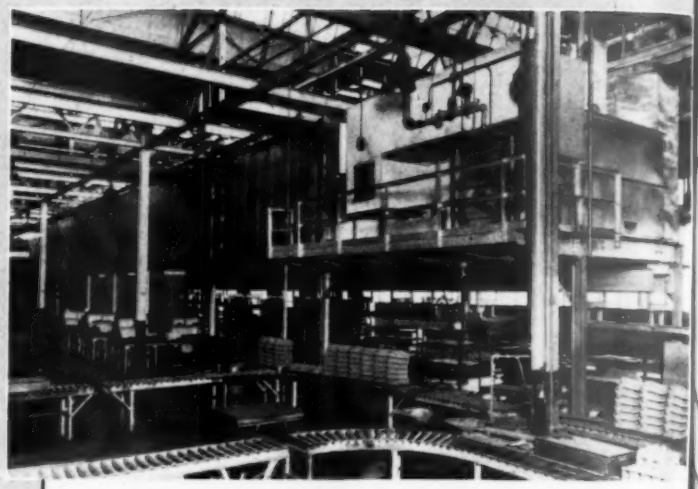
Builders of the Most Complete Line of
SHOVELS-CRANES-DRAGLINES

LINK-BELT SPEEDER CORPORATION, 301 W. PERSHING ROAD, CHICAGO 9, ILL.
(A DIVISION OF LINK-BELT COMPANY)

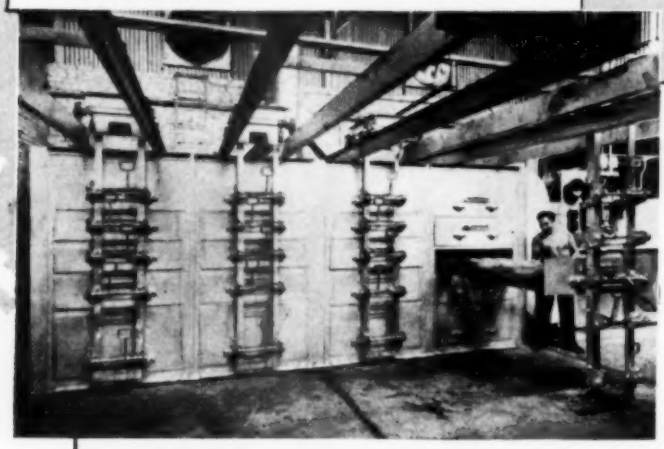
COLEMAN OVEN



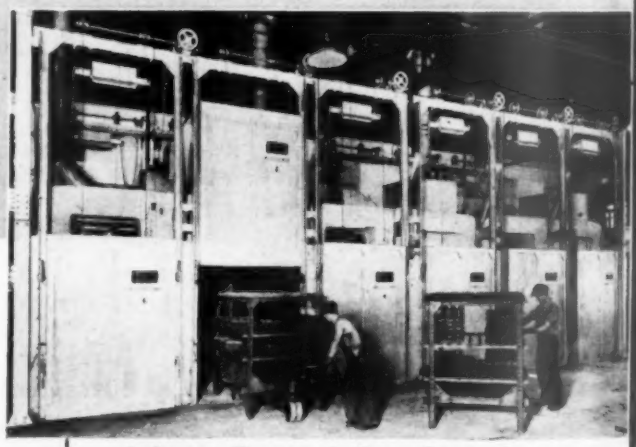
Coleman Tower Core Oven. Patented center passageway permits loading from inside as well as outside the Tower and increases loading accessibility by as much as 300% compared with other designs of vertical conveyor ovens.



Coleman Horizontal Conveyor Core Ovens for large scale specialized production.



Coleman Rolling Drawer Core Ovens for speedy baking of small and medium cores.



Coleman Transrack Core Ovens for operation with portable racks. Single or multiple rack capacity.

COLEMAN CORE AND MOLD OVENS

THE FOUNDR[illegible]Q

BUILDERS OF COLEM[illegible]ND

CLEVELAN[illegible], O

for Greater Production with Less Man-Power!

COLEMAN OVENS boost production because they make possible the most efficient use of skilled and unskilled labor.

PERFECT BAKING eliminates man-power losses due to make-overs and casting rejects.

EFFICIENT AND MODERN MECHANICAL DESIGNS reduce handling and other indirect labor to absolute minimum.

HEAVY DUTY CONSTRUCTION assures dependable performance under the most severe operating conditions with minimum labor for maintenance.

AUTOMATIC HEATING SYSTEMS not only provide perfectly controlled results but remove need for fuel handling or firing supervision.

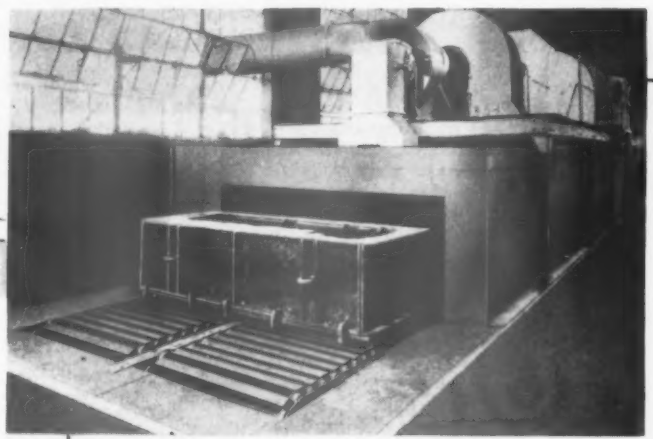
These are but a few of the many ways in which Coleman Ovens have helped thousands of foundries everywhere, to meet production schedules in the face of acute labor shortage.

Coleman Ovens are backed by over 40 years of outstanding achievements in foundry oven development plus experience and know-how gained from over 8,000 successful core and mold oven installations.

THE MOST COMPLETE LINE OF FOUNDRY OVENS BUILT!

Write for Folio of Bulletins

Coleman Car Type Ovens for baking big cores and drying molds. No job too large.



Coleman Conveyor Mold Ovens for high speed continuous drying of molds.

QUIPMENT CO.
ND SWARTWOUT OVENS
, OHIO, U.S.A.

COLEMAN
CORE AND MOLD
OVENS

Look Into Everything ROLLER CONVEYORS Can Do . . . Ask STANDARD CONVEYOR

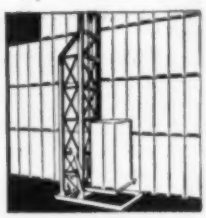
THE steps you take now — the investment in equipment that you may make to cut handling costs will not only pay dividends immediately but can be expected to yield equal or even greater returns in postwar days to come, when handling and other unproductive costs will be under the closest scrutiny.

For example, roller conveyors installed now will be useful in many ways no matter what you may be making or handling when peacetime is here. Roller conveyors are unequalled in low first cost, flexibility and minimum operating expense. They handle a wide range of commodities —parts, packages, units, cartons, cans, bottles, barrels, bundles, drums, boxes. They are available in light, average, or heavy-duty types for either portable or stationary use — in a wide variety of sizes, styles and lengths. Roller conveyors are built in their entirety by Standard, including the vital bearings which are manufactured to the highest standards.

Besides roller, Standard builds belt, chain, slat, and push-bar conveyors, also spiral chutes, tiering and lifting machines, portable pilers, and pneumatic tube systems.

On any conveyor requirement Standard Conveyor is equipped by experience and facilities to recommend and furnish the right type of equipment.

STANDARD CONVEYOR CO.
General Offices: North St. Paul, Minn.
Sales and Service in Principal Cities
Dept. F 104


TIERING AND LIFTING MACHINES

PORTABLE PILERS

SPIRAL CHUTES

PNEUMATIC TUBE SYSTEMS

(*Concluded from page* 176)

the results of job analysis can be important, in addition to revealing certain existing hazards to the analyst at time of interview.

Efficiency requires that each piece of work be done by the simplest method possible. A study and an analysis of the job opens ways and means of simplifying the work.

The benefits accruing to a foundry through job evaluation can be summarized as follows:

1. Stabilized labor costs.
2. Job descriptions.
3. An evaluation scale.
4. A firm wage foundation for long term personnel policies.
5. Satisfied employes.

War Industry Film Is Available

A new War Department film entitled "Men of Fire" and specifically directed to the castings and forging industries, has been prepared by the Motion Picture Branch, Industrial Services Division, 1501 Broadway, New York 18. Designed for showing to employes of casting and forging plants, it shows numerous combat scenes in Africa, Sicily and Normandy, and tells the story of what Americans must do to end this war—to keep America strong forever—stay on the job and do it well. Running time of the film is 15 minutes. It is available in 16 and 35 millimeter, soundtrack, widths through the Industrial Service Division at the address given or through local distributors for $1. In addition to "Men of Fire" a number of combat films designated "Film Communiques" are available for showing in connection with the film.

Book Review

Proceedings of the Institute of British Foundrymen, edited by J. Bolton, cloth, 294 pages, 7¼ x 10 inches, published by the Institute of British Foundrymen, Manchester, England.

This volume contains the papers presented at the fortieth annual general meeting of the institute, and also a number of selected papers presented at branch meetings held during the 1942-1943 session. In addition the book also contains information on awards of medals and diplomas by the I.B.F., reports of the annual general meeting, technical committee, and the presidential address of Daniel Sharpe.

Twenty-six papers are published in the book of which 10 were presented at the annual meeting, and 16 before various branches of the institute. They cover a wide range of topics relating to nonferrous, gray iron, malleable cast iron, steel, and light alloys, as well as to cores, radiography, enamelling, fuel conservation, industry and education, and reclamation of nonferrous scrap. Both name and subject indexes are included to aid in location of material.

IMPORTANT FIRST STEPS

To Great Developments!

BEFORE full strides in production are possible, every product must pass through the first painstaking steps of laboratory research and pilot plant testing. Success at these critical stages of development depends much upon fine or "special" chemicals of unvarying quality and purity. While only small amounts may be required at first, *large quantities* are often necessary for full scale manufacture.

The furnishing of such fine and "special" chemicals for industry is a familiar and widely-known service of the Baker & Adamson Division of the General Chemical Company.

. . . Baker & Adamson has long been recognized for the exceptionally high standards of purity maintained in the manufacture of its laboratory reagents and fine chemicals. Today new and expanded facilities *increase still further its capacity for producing such chemicals in industrial quantities!*

Why not plan now with Baker & Adamson and be sure of having the fine or "special" chemicals for every step of your product development when you need them?

GENERAL CHEMICAL COMPANY

Fine Chemicals for Industrial America

GENERAL CHEMICAL COMPANY
40 RECTOR STREET, NEW YORK 6, N. Y.

Technical Service Offices: Atlanta • Baltimore • Boston • Bridgeport (Conn.) Buffalo • Charlotte (N. C.) • Chicago • Cleveland • Denver • Detroit • Houston Kansas City • Milwaukee • Minneapolis • New York • Philadelphia • Pittsburgh Providence (R. I.) • St. Louis • Utica (N. Y.)

Pacific Coast Technical Service Offices:
Los Angeles • San Francisco • Seattle, Wenatchee and Yakima (Wash.)

In Canada: The Nichols Chemical Company, Limited • Montreal • Toronto • Vancouver

WASHINGTON
★ ★ ★ Notes

RELATIVELY few manufacturers have applied for or received permission from WPB to start or increase production of civilian goods when such operations do not interfere with the war effort. This was expected to be the case when WPB a short time ago outlined the procedure whereby producers of consumers durable products would be authorized to make items previously banned. Too many manufacturers still are loaded with war work and short on help to be able to sandwich in additional production of a civilian nature.

★ ★ ★

From all indications relaxation of war production will be substantial and fairly prompt after Germany collapses. Some controls will be retained over materials needed to handle Japan, but industry otherwise will be encouraged to build up civilian goods production as rapidly as possible. This will mean the cancelling of numerous WPB orders which now channel the great majority of manufacturing capacity and materials into war and essential civilian items.

★ ★ ★

AS THE armed forces turn to concentrate upon Japan, industry can forget about most of the preference ratings, it has struggled with the last few years. It is proposed to have only one rating, in addition to the present emergency AAA rating, and this one will be reserved exclusively for military programs. All other production will be unrated. Manufacturers still will be obliged to fill rated military orders ahead of all other business, but the former are expected to shrink about 40 per cent within 3 months after Germany goes under.

★ ★ ★

No programming of civilian production is expected to be necessary after the European phase of the war is over. Information WPB has on available supplies of materials, components, facilities and manpower indicates that maximum civilian output can be achieved without detailed priorities regulation from Washington. However, WPB expects to retain its Industry Divisions and its Industry Division Requirements Committees whose job will be to make certain that no one is permitted to procure an unreasonable amount of any material or product, that needed materials and components are made available to top essential civilian activities such as transportation, utilities and fuel, and that small business is given an equal opportunity to secure materials and supplies. It is planned to continue the Controlled Materials Plan only for the quarter in which European hostilities cease.

★ ★ ★

FINANCIAL assistance for manufacturers affected by termination of war contracts is expected to speed the conversion to civilian production. T-loans, guaranteed through Federal Reserve Banks, will enable a war contractor to convert into cash at his local bank approximately 90 per cent of the sound value of his war assets frozen by contract termination. Subcontractors, as well as prime contractors, are eligible for T-loans.

★ ★ ★

Smaller War Plants Corp. has announced that any small firm whose war contract is terminated will be excused from making payments of interest and

(*Concluded on page* 184)

CUT OFF

GATES and RISERS in any metal

in far Less Time with

Tannewitz METAL CUTTING BAND SAWS

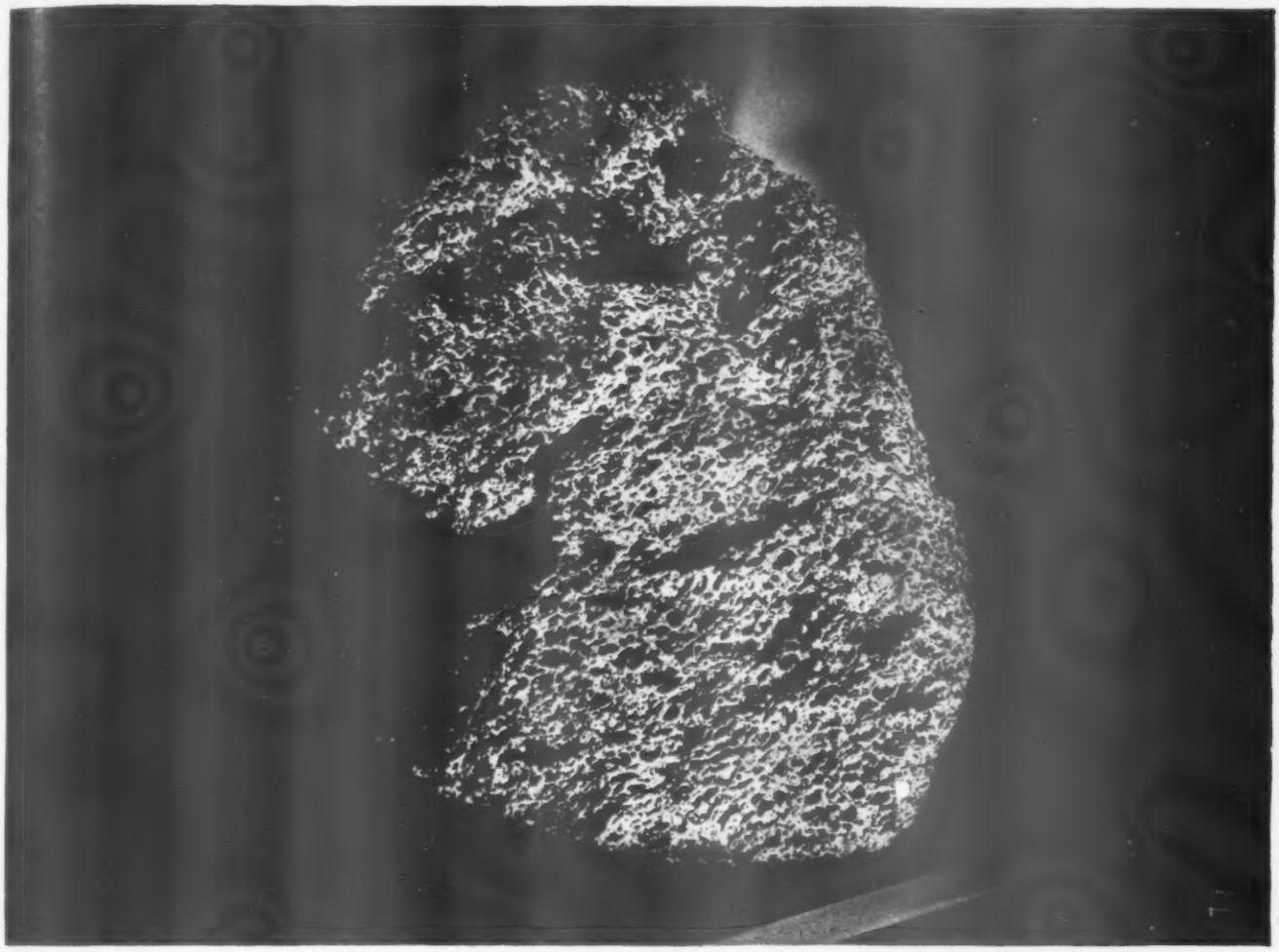
Variable Speed

Models to fit Every Need

In addition to our regular High Speed Band Saws delivering over 2 miles of smooth vibrationless saw travel per minute, which have proved so exceedingly popular in automotive and aviation work, the TANNEWITZ line now offers five other models to provide the fastest cutting medium for every foundry need: a 30" machine available in any 3:1 speed variation from 100:300 or 1000:3000 blade feet per minute—a similar machine with 3-step V-belt drive to give 2300, 3100, 4000 blade feet per minute—a 36" machine with 32" capacity under the guide—a model with 48" wheels and one with 52" wheels, operating at 3,000 blade feet per minute for handling extra large castings. Get a line on the TANNEWITZ metal cutting band saw that fits your particular needs. It will save time, step up production and repay its cost dozens of times. Write for full particulars NOW!

THE TANNEWITZ WORKS, GRAND RAPIDS, MICHIGAN

Number 4 of a Series: *"Looking at the 5 essential things you never see in electrodes"*



a MATERIAL difference!

HAS IT GOT what it takes to make an electrode that will stand the gaff? Or does this chunk of petroleum coke hide sure-fire trouble for somebody's electric furnace?

The eye certainly cannot tell. Yet there's an all-important "material difference" between almost every two petroleum coke samples. The same goes for coal tar pitch, or anthracite coal.

At National Carbon Company, a tireless program of *raw materials selection* sifts from the wide range of samples only those known to be best for the "National" and "Acheson" electrodes you purchase... electrodes of good shock resistance, uniform size, high electrical conductivity, and slow consumption... for making electric steel and other products of the electric furnace.

But in the finished electrode, *raw materials selection* is just one element of quality. One of the *"five* essential things you never see in electrodes!" The others—manufacturing experience, manufacturing control, continuing research, and customer service. Write or call at our nearest office about these essential things you *never see!*

NATIONAL ELECTRODES

ACHESON GRAPHITE

The words "National" and "Acheson" and the "National" and "Acheson" Seals are registered trade-marks of National Carbon Company, Inc.

NATIONAL CARBON COMPANY, INC.
Unit of Union Carbide and Carbon Corporation
UCC
GENERAL OFFICES: 30 East 42nd Street, New York 17, N.Y.
DIVISION SALES OFFICES: Atlanta, Chicago, Dallas, Kansas City, New York, Pittsburgh, San Francisco
In Canada: Canadian National Carbon Company Limited, Welland, Ontario

BUY UNITED STATES WAR BONDS

(*Concluded from page* 182)

principal on SWPC loans until the government pays its termination claim. The rate of interest on such loans has been reduced to 2½ per cent, the same as the rate to be paid to the contractor by the Army or Navy when a termination claim is settled.

★ ★ ★

DOMESTIC transportation will be allotted in the fourth quarter only two-thirds of the amount of steel and copper requested by the Office of Defense Transportation. Changes in the military situation, of course, can and may result in an increase in the amount of material that will be made available for the railroads and automotive replacement purposes. Allocations for heavy trucks for commercial use are restricted by the decision of military agencies to continue their heavy purchase of trucks into 1945.

★ ★ ★

The Navy's requirements for motor graders during 1945 *are expected to be about* 75 *per cent above those of* 1944. *No change is indicated for Army requirements. Capacity of the five companies making motor graders is estimated at about* 6000 *units, compared with normal peacetime production of* 5000 *annually.*

★ ★ ★

ON THE basis of 60 days' lead time between production of gray iron castings and construction of vehicles, casting requirements of the Ordnance Department to meet programs on trucks of all kinds, tanks, and combat vehicles are as follows: 31,000 tons a month through October; 28,000 tons a month from November through January, 1945; 24,000 tons a month from Feb. 1, 1945. These figures include requirements of spares, being approximately 12.5 per cent on trucks and 25 per cent on combat vehicles.

★ ★ ★

For an industry that has made more than 800,000 *tons of gray iron castings a month, the need for* 30,000 *tons seems a small order. Unfortunately, it is not a matter of tonnage alone, but primarily one of sufficient capacity and manpower to make the particular type of castings needed to carry out the Army truck program.*

★ ★ ★

A LOT of the machinery built to make war weapons will be of little or no use in peacetime, but the nation will have a sizable army of men and women skilled in numerous industrial operations when the war is over. During the 4 years ended June 30 more than 13,300,000 persons enrolled in organized training programs for war jobs. About half of these were enrolled in public vocational schools. In addition, the Training Within Industry program enrolled 1,375,767 supervisors who in turn provided instruction for millions of war plant workers.

★ ★ ★

If we add to the foregoing figures the many soldiers and sailors who have become proficient in certain skills which have definite peacetime application it appears that industry will have a sizable reservoir of trained workers for years to come.

★ ★ ★

REVISIONS in the aircraft production program are expected to result in the release of some 120,000 workers by the end of the year. War developments have resulted in greater need for the superbombers and less for the shorter-range bombers, and readjustment of transport types for longer range and capacity.

★ ★ ★

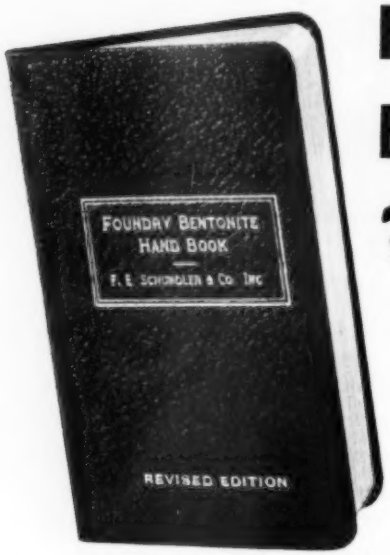
Materials exempted recently from allocation control include beryllium and styrene, supplies of which now are regarded as sufficient. Styrene, important raw material in production of synthetic rubber, also is used in impregnating magnesium castings.

W.G.G.

Industrial Hygiene Foundation To Meet

Ninth annual meeting of the Industrial Hygiene Foundation, an association of industries for the maintenance of healthful working conditions, will be held at Mellon Institute, Pittsburgh, the foundation's headquarters, Nov. 15-16. The program, geared for management, will consider sickness in industry and problems connected with sick absenteeism which call for postwar solutions.

Now ready! NEW FOUNDRY BENTONITE *Hand Book*



Pocket size. Leather cover. Contains tables, formulas and other reference data.

EVERY FOUNDRYMAN can profitably use this book ... which presents the experience of engineers who have specialized in Foundry sand. It contains recommended sand mixes, adapted to all types of gray iron, malleable and steel castings. Every mix presented has been thoroughly proved in practice.

Schundler Bentonite is strictly a laboratory controlled product and is especially "tailored" for Foundry use.

Schundler Bentonite is sold with a complete technical service fitted to your individual needs. This service is available upon request. Write today for your free copy of the new Foundry Bentonite Handbook.

F. E. SCHUNDLER & CO., INC.
520 RAILROAD STREET • JOLIET, ILLINOIS
SCHUNDLER
BENTONITE

STERLING

THE WHEELS OF INDUSTRY

Tomorrow's *"Wheels of Industry"* Are Being Created **Here Today!**

Sterling's reprinted Catalog 44 is just off the press . . write on your letterhead and this big book full of important grinding data is yours for the asking.

The pioneering spirit that started the manufacture of Sterling Grinding Wheels over a half-century ago still lives in the modern laboratories of our company. Here, technicians are studying new ways to advance the quality of the "Wheels of Industry" even higher than it is today!

It is a continuous process—this laboratory development of items and methods new to grinding departments in all types of industry. That is why your Sterling Grinding Wheels always seem to possess the latest advancements . . why your grinding seems easier and costs lower when Sterling is working for you.

Post-war problems are going to find us ready to solve them. Already, in our laboratories we have found many new ideas that are going to mean better grinding of the new alloys which peace is going to bring. You can place your confidence in Sterling's technical development; it is going places these days!

Ask for the free, on-the-job advice of a Sterling engineer. If necessary, your problem will be handled by both our advisory committee and our laboratory staff. Then, it will be translated into the correct combination of grain, bond, structure, size, and shape that finally becomes the finished Sterling Grinding Wheel . . tailor-made to your specific requirements! May we serve you?

• STERLING ABRASIVES •

THE STERLING GRINDING WHEEL DIVISION

OF THE CLEVELAND QUARRIES COMPANY

TIFFIN, OHIO

THE WHEELS OF INDUSTRY

NATIONAL METAL CONGRESS

Sessions Cover Broad Field

FORTHCOMING National Metal Congress to be held in Cleveland on Oct. 16 to 20 under the sponsorship by the American Society for Metals in co-operation with the American Institute of Mining and Metallurgical Engineers, American Welding Society, American Industrial Radium and X-ray Society, and the Society for Experimental Stress Analysis, will comprise a large number of technical sessions covering a wide range of topics.

Papers of particular interest to foundrymen which will be presented at various sessions include the following:

"Properties of Aluminum Alloys Melted in an Induction Heated Crucible Furnace," by James W. Poynter, Army Air Forces, Wright Field, which will be presented at a meeting of the American Society For Metals on hardenability on Tuesday morning.

"A Comparison of Microhardness Indentation Tests," by Douglas R. Tate, National Bureau of Standards; "Improved Sensitivity in Double Exposure Radiography," by James Rigbey, Ford Motor Co. of Canada, and "Interpretation of Radiographs — Particularly of Aircraft Parts," by Leslie W. Ball, Triplett & Barton Inc., which will be presented at a meeting of the American Society for Metals on radiography and testing on Thursday morning.

"Chromium Steels of Low Carbon Content," by Russell Franks, Union Carbide & Carbon Research Laboratories; "Characteristics and Properties of Some Cast Chromium-molybdenum Steels," by N. A. Ziegler and W. L. Meinhart, Crane Co., and "The Segregation of Molybdenum in Phosphorus Bearing Alloyed Gray Cast Iron," by F. B. Rote, Wyman-Gordon Co., and W. P. Wood, University of Michigan, which will be presented at a meeting of the American Society for Metals on chromium and molybdenum alloys on Friday morning.

W. H. EISENMAN
Secretary, A.S.M.

"Arc Welding Practices in the Steel Foundry," by Frank Kiper and Lawrence Gabes, Ohio Steel Foundry Co.; "Machine Cutting of Risers, Flame Scarfing To Remove Padding, and Flame Gouging To Remove Webs and Defects," by G. E. Bellew, Air Reduction Sales Co., and "Repair of Castings," by L. A. Danse, General Motors Corp., which will be presented at a meeting of the American Welding Society on foundry practice on Thursday morning.

"Relationship Between Magnesium Core Sand Mixtures and the Burning of Magnesium," by O. J. Myers, Wright Aeronautical Co., which will be presented at a meeting of the Institute of Metals Division, American Institute of Mining and Metallurgical Engineers on magnesium on Monday morning.

"Grain Size and Properties of Sand Cast Magnesium," by R. S. Busk and C. W. Phillips, Dow Chemical Co.; "Factors Affecting Grain Growth in Germina-

(*Concluded on page* 188)

MOORE RAPID *Lectromelt* FURNACES

Unexcelled For Foundry Production

Foundries throughout the world are increasing their tonnages of quality controlled steels and irons with Lectromelt furnaces. Lectromelt's design features and construction characteristics permit quicker charging with minimum heat loss between melts.

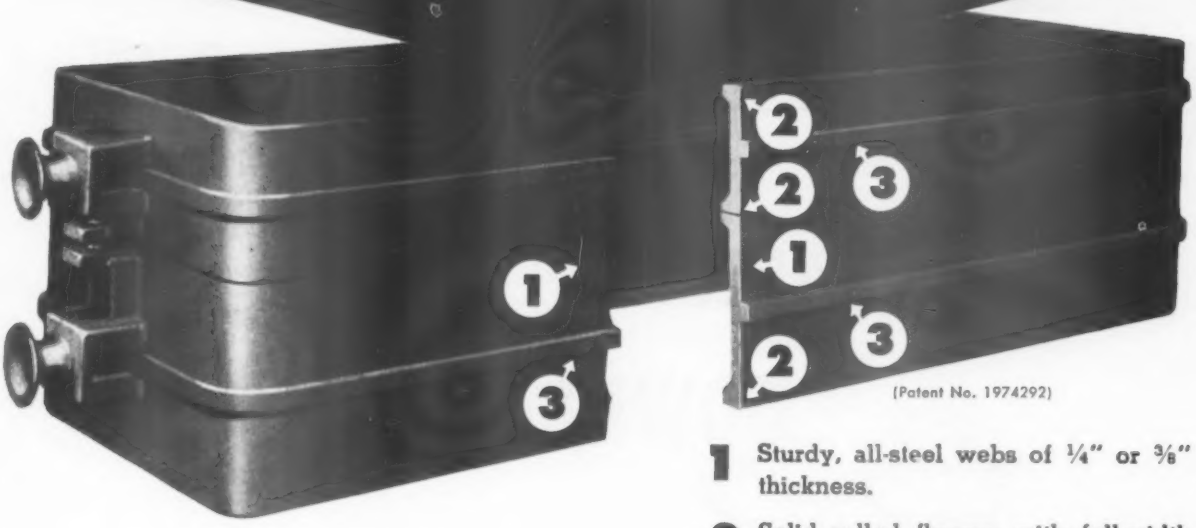
The illustrated foundry, located in the Pacific Northwest is operating two Lectromelts, one rated at 4 tons per hour and the other at 2 tons per hour. Call on our representative for further data.

ARMY E NAVY

PITTSBURGH LECTROMELT FURNACE CORPORATION

PITTSBURGH, PENNSYLVANIA

Sterling GIVES YOU SOLID Construction!



(Patent No. 1974292)

1 Sturdy, all-steel webs of ¼" or ⅜" thickness.

2 Solid rolled flanges with full-width bearing.

3 Husky, solid center reinforcing bars.

Sterling LIFETIME Foundry Flasks have long proven their practical combination of maximum strength with minimum weight. The cut-away view, shown above, tells the story. Note the husky rolled channel steel construction . . . the solid center reinforcing bars . . . the thick flanges with square corners and full-width bearing. Frankly, can you think of any other foundry flask that offers such SOLID construction?

Sterling FOUNDRY FLASKS

STERLING WHEELBARROW COMPANY • MILWAUKEE, WIS., U. S. A.

A 4334-1P

(*Concluded from page* 186)

tion of Magnesium Alloy Castings," by A. T. Peters, R. S. Busk and H. E. Elliott, Dow Chemical Co., and "Grain Size of Sand Cast Magnesium Alloys," by Oscar Blohm, Hills-McCanna Co., which will be presented at a meeting of the Institute of Metals Division, A.I.M.E. on grain size of magnesium on Monday afternoon.

"Application of Nonferrous Alloys in Stress Design," by J. J. Kanter, Crane Co.; "Creep Test Methods and the Interpretation of Creep Data," by P. G. McVetty, Westinghouse Electric & Mfg. Co., and "Creep Properties of Cast Bronze," by H. E. Montgomery, Lunkenheimer Co., which will be presented at a meeting of the Institute of Metals Division, A.I.M.E. on creep of nonferrous metals and alloys on Tuesday morning.

"Requirements in Specifications for Uniform Radiographic Technique," by George A. Russ; "Automatic Film Processing and Equipment," by Robert Sanderson; "Quality Control of Radiographs by a Direct Density Check," by Emery Meschter; "A Practical Comparison of Fluoroscopy with Radiography," by Robert Mayer; "Filtration," by Don M. McCutcheon, and "Three Dimensional Radiography," by Douglas Wineck which will be presented at meetings of the American Industrial Radium and X-ray Society Inc. to be held on Friday.

In addition to the numerous technical sessions of the various participating societies a War Conference Display will be held in the Public Auditorium. That will comprise nearly 400 exhibits, many of them with equipment in operation, which will illustrate new developments in the field of metals resulting from the increased tempo of wartime manufacture and research. Exhibition will be open from 12 noon until 10:30 p.m., Monday through Friday, with the exception of Thursday when it will close at 6:00 p.m.

KEEP UPKEEP... DOWN!

HERE'S HOW—

Use SAHARA Belting for hot sand-handling and REXALL for cold sand and castings . . . Your costs will be slashed!!

HERE'S POSITIVE PROOF—

Over 80% of all our accounts are more than 15 years old. . . . Many dating back to 1912.

Write us for bonafide performance exhibits . . . no obligation and no personal follow-up unless requested.

IMPERIAL BELTING COMPANY

1750 S. KILBOURN CHICAGO 23, ILL.

OBITUARY

Albert H. Killinger, 50, vice president and director of Laclede-Christy Clay Products Co., St. Louis, died Aug. 18 in Durango, Colo. A native of Collinsville, Ill., Mr. Killinger entered the Laclede-Christy company as traffic manager in 1919, and subsequently became purchasing agent, division sales manager, and vice president in charge of refractory sales. He was made a member of the board of directors in 1943.

* * *

Rupert K. Stockwell, 62, associated with Robins Conveyors Inc., Passaic, N. J., for many years, died Aug. 24 in Oakland, Calif. A native of Birdsall, N. Y., Mr. Stockwell joined the company as a draftsman in 1911. Much of his time was spent in charge of engineering and sales for Robins Conveyors in Europe and the Far East. Since 1938, when he opened the company's San Francisco office, he had headed sales operations on the Pacific coast.

* * *

William B. Marvin, 64, secretary of Farrel-Birmingham Co. Inc., Ansonia, Conn., died Aug. 13 in that city. Mr. Marvin entered the employ of Birmingham Iron Foundry in 1905 and was treasurer of that company at the time of the amalgamation of the Farrel and Birmingham companies in 1927. He became assistant secretary and director of the new company and in 1943 was elected secretary.

* * *

Morris Loewen, 86, president of the Los Angeles Magnesium Casting Co., Los Angeles, died Sept. 4 at his home in that city.

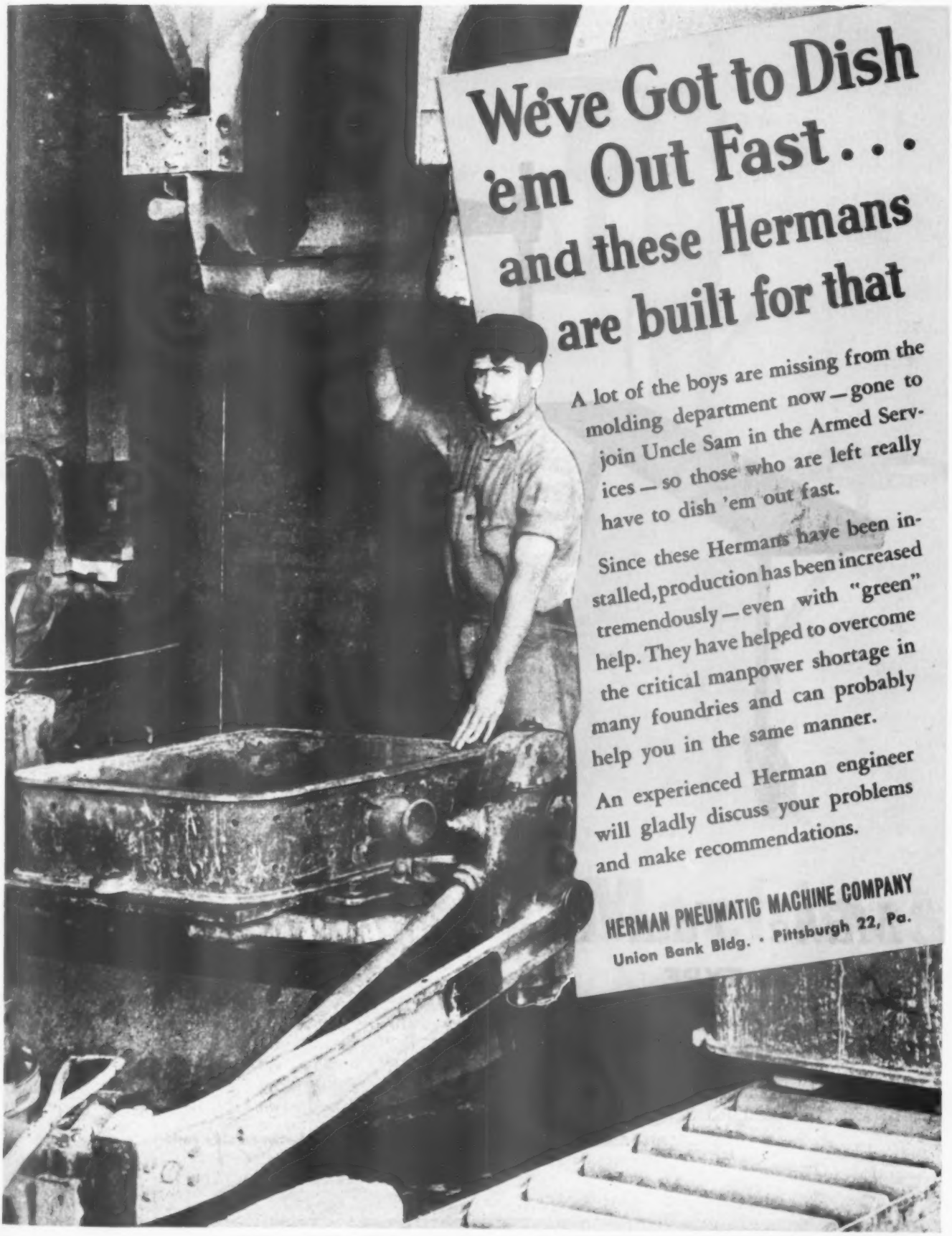
* * *

Clarence E. Williams, 67, one of the organizers and former vice president and director, National Gypsum Co., Buffalo, died Sept. 7 in Evanston, Ill.

* * *

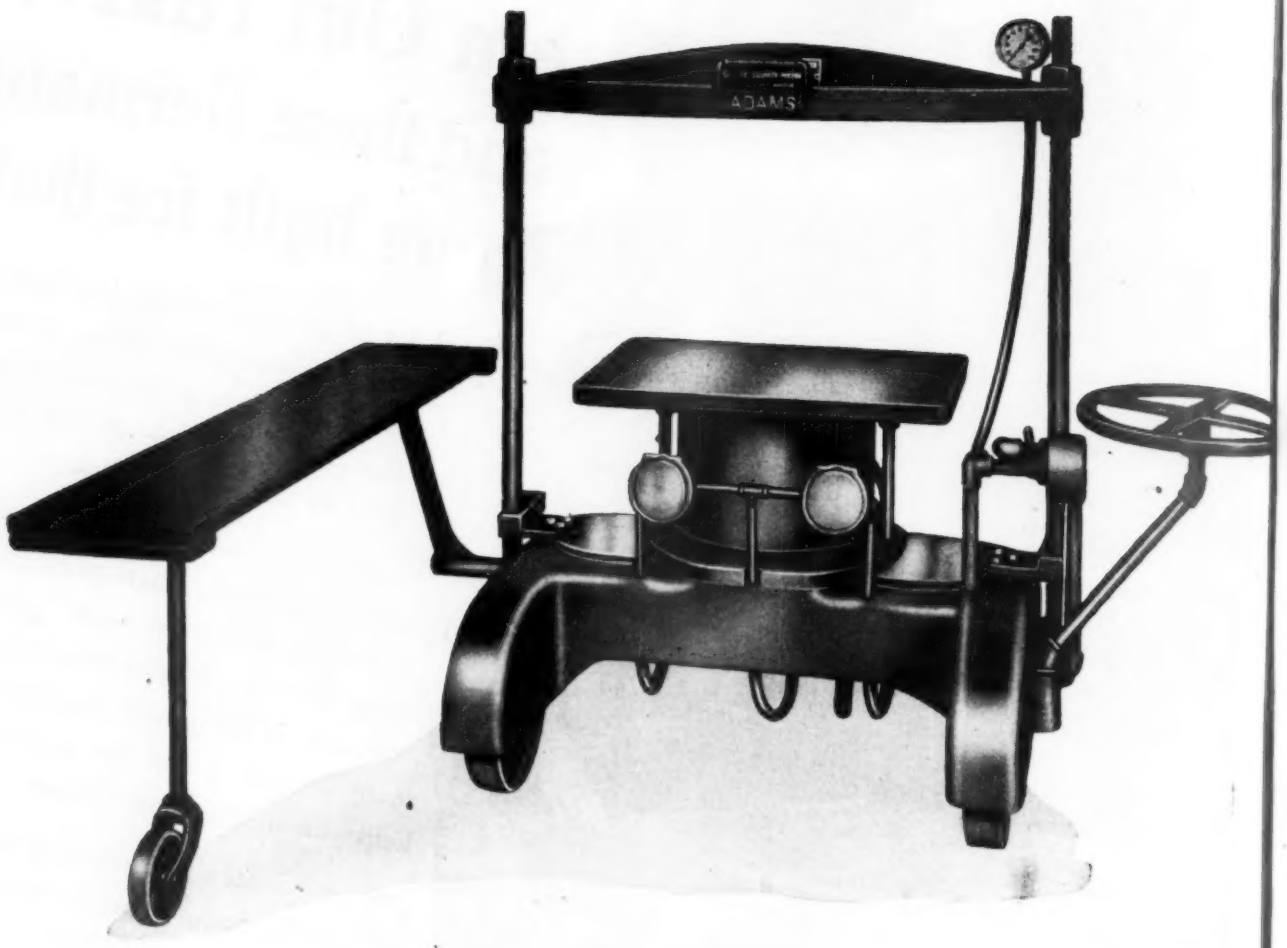
William E. Wehr, 61, vice president and one of the organizers of the Wehr Steel Co., Milwaukee, died Aug. 24, in that city.

Delta Mfg. Co., Milwaukee, has been awarded first place among national magazine advertising in the annual competition sponsored by the National Advertising Agency Network.


We've Got to Dish 'em Out Fast . . . and these Hermans are built for that
A lot of the boys are missing from the molding department now—gone to join Uncle Sam in the Armed Services—so those who are left really have to dish 'em out fast.
Since these Hermans have been installed, production has been increased tremendously—even with "green" help. They have helped to overcome the critical manpower shortage in many foundries and can probably help you in the same manner.
An experienced Herman engineer will gladly discuss your problems and make recommendations.
HERMAN PNEUMATIC MACHINE COMPANY
Union Bank Bldg. . Pittsburgh 22, Pa.

MOLDING **HERMAN** MACHINES

HERMAN PNEUMATIC MACHINE CO., UNION BANK BUILDING, PITTSBURGH, PA.



The 12′-38′ Adams Jolt Squeezer, Portable Type

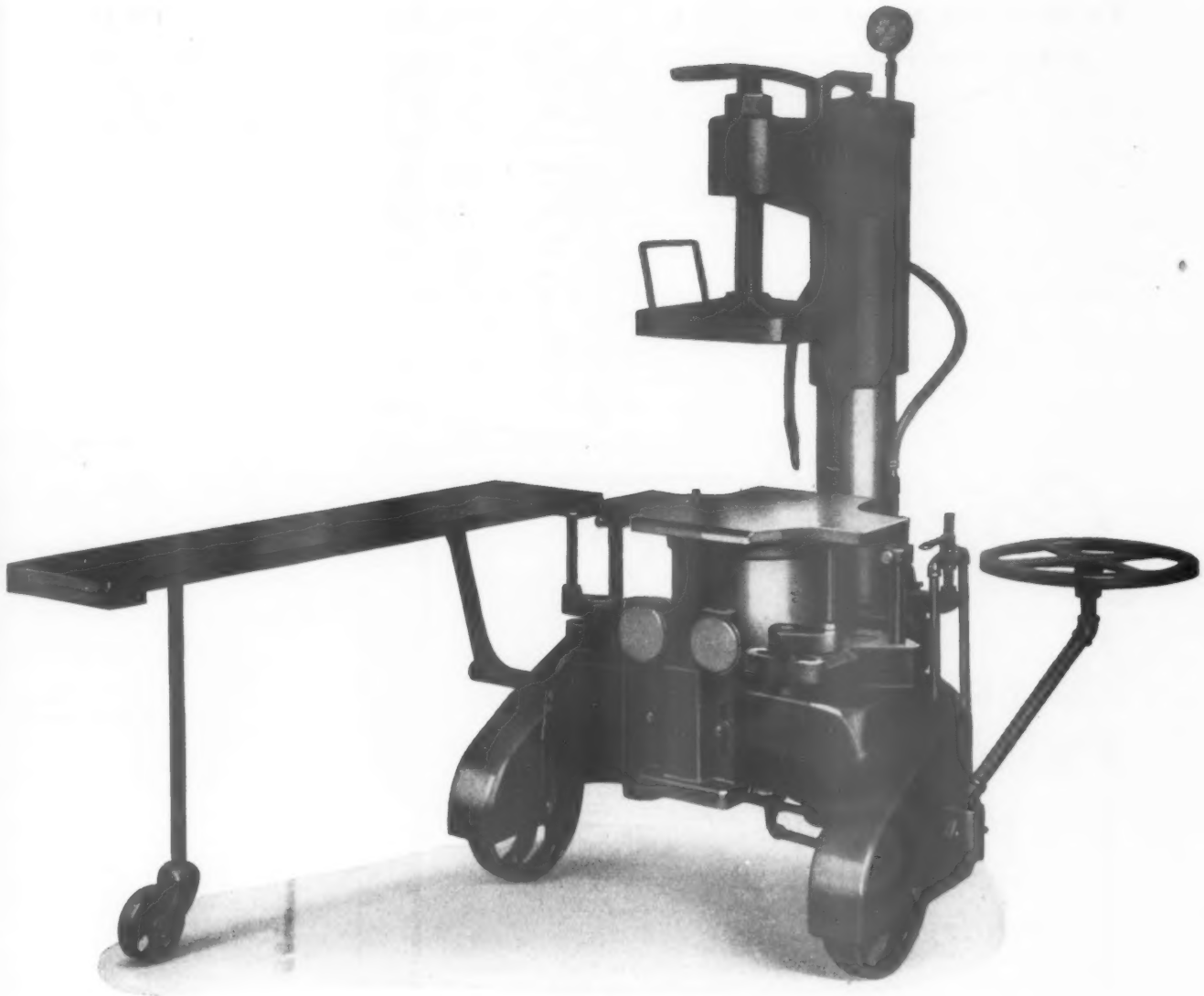
Make Your Selection From This List

SIDE ROD TYPE PORTABLE OR STATIONARY	Squeeze Piston diameter	Jolt Piston diameter	Clearance between Side Rods	Pattern Draw, Adjustable
10″-32″ Jolt Squeezer	10″	4″	32″	
12″-38″ Jolt Squeezer	12″	5″	38″	
16″-42″ Jolt Squeezer	16″	6″	42″	
10″-32″ Universal Jolt Squeezer	10″	4″	32″	3″ to 6″
12″-38″ Universal Jolt Squeezer	12″	5″	38″	3″ to 6″

Also Adams Hand Squeezers —30′, 34′ or 38′ between side rods— Portable or Stationary.

THE ADAMS COMPANY

MOLDING MACHINES · FLASK



The 10″ Post Type Universal Squeezer, Portable Type

Adams Molding Machines

POST TYPE PORTABLE OR STATIONARY	Squeeze Piston diameter	Jolt Piston diameter	Pattern Draw, Adjustable
10″ Post Type Jolt Squeezer	10″	4″	
12″ Post Type Jolt Squeezer	12″	5″	
10″ Post Type Universal Jolt Squeezer	10″	4″	3″ to 6″
12″ Post Type Universal Jolt Squeezer	12″	5″	3″ to 6″

Also manufacturers of Snap Flasks, Slip Flasks, Jackets, Bands, Presser Boards, Bottom Plates, Upsets, Match Frames, Tubular Sprue Cutters and Vibrators.

Y · DUBUQUE, IOWA · U.S.A.

QUIPMENT · Established 1883

To Discuss Electric Steel Practice

Second annual Electric Furnace Steel Conference sponsored by the Electric Furnace Steel Committee, Iron & Steel Division, American Institute of Mining and Metallurgical Engineers will be held in Hotel William Penn, Pittsburgh, on Oct. 5 and 6.

Committee for the conference includes Chairman Charles W. Briggs, Steel Founders' Society of America, Cleveland; Vice Chairman W. J. Reagan, Copperweld Steel Co., Warren, O.; Samuel Arnold III, American Bridge Co., Pittsburgh; W. M. Farnsworth, Republic Steel Corp., Canton, O.; Karl L. Fetters, Youngstown Sheet & Tube Co., Youngstown, O.; R. H. Frank, Bonney-Floyd Co., Columbus, O.; R. C. Good, Union Electric Steel Corp., Pittsburgh; R. P. Heuer, General Refractories Corp., Philadelphia; John Juppenlatz, Lebanon Steel Foundry, Lebanon, Pa.; Andrew Kaul III, International Graphite & Electrode Corp., St. Marys, Pa.; G. A. Lillieqvist, American Steel Foundries, East Chicago, Ind.; F. A. Melmoth, Dctroit Steel Casting Co., Detroit; H. E. Phelps, Rotary Electric Steel Co., Detroit; Fred B. Riggan, Key Co., East St. Louis, Ill.; J. F. Robb, Climax Molybdenum Co., Pittsburgh; G. E. Stoltz, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., and Norman I. Stotz, Universal-Cyclops Steel Corp., Titusville, Pa.

Joint technical sessions on acid and basic practices will be held on Thursday, Oct. 5 with the annual dinner at night. C. M. White, Republic Steel Corp., Cleveland, will be toastmaster, and Michael MacDougall will be the speaker. On Friday, Oct. 6 simultaneous sessions will be held on basic steel and acid steel melting practices. Tentative program follows:

Thursday, Oct. 5

8:30 a.m.—Registration

9:30 to 10:00 a.m.—General Session

Welcoming remarks, by Charles W. Briggs, chairman, committee for second annual conference.

Response, by H. W. McQuaid, chairman, Electric Furnace Steel Committee.

Announcements and reports.

10:00 a.m. to 12:00 m.—Performance and Maintenance of Equipment for Electric Arc Furnaces.

Chairman Glen E. Stoltz, Westinghouse Electric & Mfg. Co.; Co-chairman R. M. Atwater, Ingersoll Steel & Disc Division, Borg-Warner Corp.

Problems in the Effective Use of Power in Electric Furnace Steel Production, by L. W. Long, Allis-Chalmers Mfg. Co.

Maintaining Electrical Equipment to Minimize Delays

a. Regulators; b. Relays; c. Circuit breakers; d. General electrical maintenance.

Maintaining Mechanical and Auxiliary Equipment to Minimize Delays

a. Charging machines; b. Cranes; c. Other auxiliary equipment; d. Minimizing time losses.

Handling and Proper Use of Electrodes

a. Preventing electrode breakage.

2:00 to 5:00 p.m.—Refractories

Chairman J. E. Arthur, Crucible Steel Co. of America; Co-chairman R. B. Heuer, General Refractories Co.

Care and Handling of Refractories

Roof Design and Maintenance

a. New developments; b. Factors affecting roof life, large furnaces (type of scrap, charging, variations in power, melting and refining practice, other factors); c. Factors affecting roof life, small furnaces

Basic Side Walls—Construction and Maintenance

a. New construction methods; b. Melting variables affecting life of side walls.

Acid Side Walls—Construction and Maintenance

Basic Bottoms—Construction and Maintenance

Acid Bottoms—Construction and Maintenance

Ladles

a. Refractories; b. Nozzles and sleeves; c. Heating and cooling.

Friday, Oct. 6

Basic Steel Technical Sessions

9:30 a.m. to 12:00 m.—Melting and Oxidizing

Chairman H. B. Schulz, Carnegie-Illinois Steel Corp.; Co-chairman Gilbert Soler, Timken Steel & Tube Division, Timken Roller Bearing Co.

Proper Use of Power for Fast Melting

Control of Carbon at Meltdown

Reboil Practice

a. Object; b. Timing.

Controlling Residual Chromium

a. Opening up heats melting high in chromium; b. Meeting low chromium specifications.

Sulphur Removal in Oxidizing and Deoxidizing Periods

2:00 to 5:00 p.m.—Refining, Deoxidizing, and Pouring

Chairman K. L. Fetters, Youngstown Sheet & Tube Co.; Co-chairman R. J. McCurdy, Republic Steel Co.

Slag-metal-oxygen Relations, by John S. Marsh, Bethlehem Steel Co.

(*Concluded on page* 194)

Stearns COOL

Because They're Ventilated

Magnetic Pulleys

are the choice of more and more foundry engineers

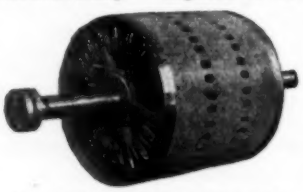
We are proud of being selected by leading engineering and equipment supply firms to furnish STEARNS Magnetic Pulleys and separators for foundry installations.

An indication of STEARNS prestige is the discerning number of manufacturers who prefer Stearns magnetic equipment year after year, in fact, our best customers are previous buyers.

Progress is born of experience and experience is your best protection. Stearns Magnetic set the pace in scientific magnetic pulley construction back in 1917 . . . Stearns Magnetic exclusively introduced the air-cooled magnetic pulley in 1922 . . . Stearns Magnetic has used the unit one-piece integrally cast magnet body since 1924.

The many new, exclusive and pioneer improvements built into Stearns magnetic products, their time proven construction, dependability and long life, economy of operation and low maintenance costs mean much to you.

Stearns Magnetic Pulleys provide a positive, automatic, time and labor savings method of reconditioning sand. Designed to fit into your conveying system and also available in complete portable separator units adaptable for sand slinger and many other uses.



Our Bulletin 301 on Magnetic Pulleys is yours. Write for it.

STEARNS MAGNETIC MANUFACTURING CO.

662 S. 8th St. Milwaukee 4, Wis.

SEPARATORS—CLUTCHES—BRAKES—DRUMS—MAGNETS

WASHED DRIED AND SCREENED SILICA SAND

Carefully Selected and Graded for Foundry Use—

FOUNDRY men throughout the country know the exceptional qualities of the uniformly screened grades of silica sand produced by the Ottawa Silica Company.

The grains being almost spherical, afford greater permeability and consequently finer sand can be used, effecting better finish.

Ottawa sands are durable! They do not break up! They are ideal for sand slinger work and are without equal for all foundry purposes where synthetic sands are employed.

FLINT MOLDING AND CORE SAND SILICA

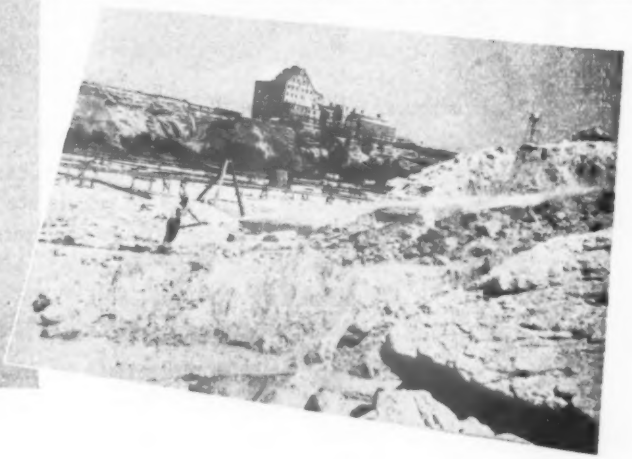
A HARD, fast-cutting, thoroughly washed, dried Sandblast Sand, screened to uniform size, is produced by the Ottawa Silica Company and sold under the trade names FLINT SHOT and DIAMOND SANDBLAST SAND. It is the most economical agent that can be employed for all kinds of exacting sandblast cleaning. The round, pearl-like grains are hard as flint. They do not split up, but wear down uniformly and can be used over again many times. This abrasive flows freely, requiring less air power and gives the castings a smooth, silvery-like, velvety finish. Ask for our booklet, "Sandblasting Up To Date".

FLINT IT PAYS TO USE SHOT

DIAMOND SAND BLAST

THE Ottawa Silica Company's three mills operate continuously the year round, making it possible to supply foundries with material promptly. Production includes a complete line of foundry sands suitable for molds, cores, furnace bottoms, sandblasting, for use generally in the steel, grey iron and non-ferrous fields—also Ground Silica (Silica Flour). The Ottawa Silica Company's engineering staff is always available for consultation and service on problems relative to the use of Ottawa Sands.

CRYSTAL 99 44/100 PURE SILICA



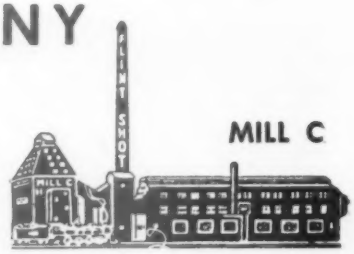
OTTAWA SILICA COMPANY

Ottawa, Illinois

MILL A

MILL B

MILL C



(*Concluded from page* 192)

Determination of Bath Temperature
Clean Steel
- a. Outline of the problem; b. Types and origin of inclusions; c. Effect of slag practice; d. Effect of deoxidizers; e. Effect of temperature; f. Effect of time under carbide slag; g. Meeting magnaflux inspection.

Pouring and Mold Practice
- a. Mold design (size and contour for various grades; type of plug brick); b. Mold coatings (material used and method of application; effect upon conditioning costs and rollability of ingot); c. Mold temperature (effect upon ingot surface and upon rollability of ingot); d. Rate of rise for various types (effect upon ingot and rollability); e. Effect of stripping time upon ingot surface and interior and upon rollability of ingot; f. Hot tops (type for various grades; materials).

Acid Steel Technical Sessions

9:30 a.m. to 12:00 m.—Control of Bath Composition
Chairman John Juppenlatz, Lebanon Steel Foundry; Co-chairman J. B. Caine, Sawbrook Steel Castings Co.
Determination of Carbon
- a. By hardness; b. By fracture; c. By magnetic methods (Leitz-Blosjo machine; Carbanalyzer; other magnetic methods); d. By chemical analysis (finger and thimble tests for rapid sampling; volumetric, gravimetric and color methods; general discussion).

Relation of Bath Condition to Sampling
- a. Conditioning bath to take test; b. Estimating and minimizing carbon changes during testing (holding) period and until heat is tapped.

Methods of Adjusting Carbon
- a. Dipping electrodes; b. Use of pig iron; c. Other methods of carbon adjustment.

Determination of Residual Aluminum

2:00 to 5:00 p.m.—Deoxidation
Chairman F. A. Melmoth, Detroit Steel Casting Co.; Co-chairman G. A. Lillieqvist, American Steel Foundries
Control of Gases in the Molten Metal
Procedure for Adding Deoxidizers
- a. Time; b. Sequence; c. Methods; d. Reasons.

Grain Size Control in the Foundry
Lime versus No Lime in the Acid Slag
- a. Summary of the pros and cons; b Discussion.

Milwaukee Chills have passed the rigid inspection of foundrymen who demand the best. These Chills have been improved to accelerate cooling, insuring sound castings free from internal shrinks and surface checks. They will also prevent molten metal from cutting into the sand. These Chills will cut scrap losses, and reduce welding and cleaning costs.

Ask for samples and prices on Milwaukee Thread Stem Chaplets . . . . Standard Radius Chills . . . . Schmitz Chaplets . . . . Patented Adjustable Radius Chills . . . . Other Chaplets and Foundry Supplies.

Milwaukee
CHAPLET AND MFG. COMPANY
MILWAUKEE • WISCONSIN

Acquires Control of Hunt-Spiller

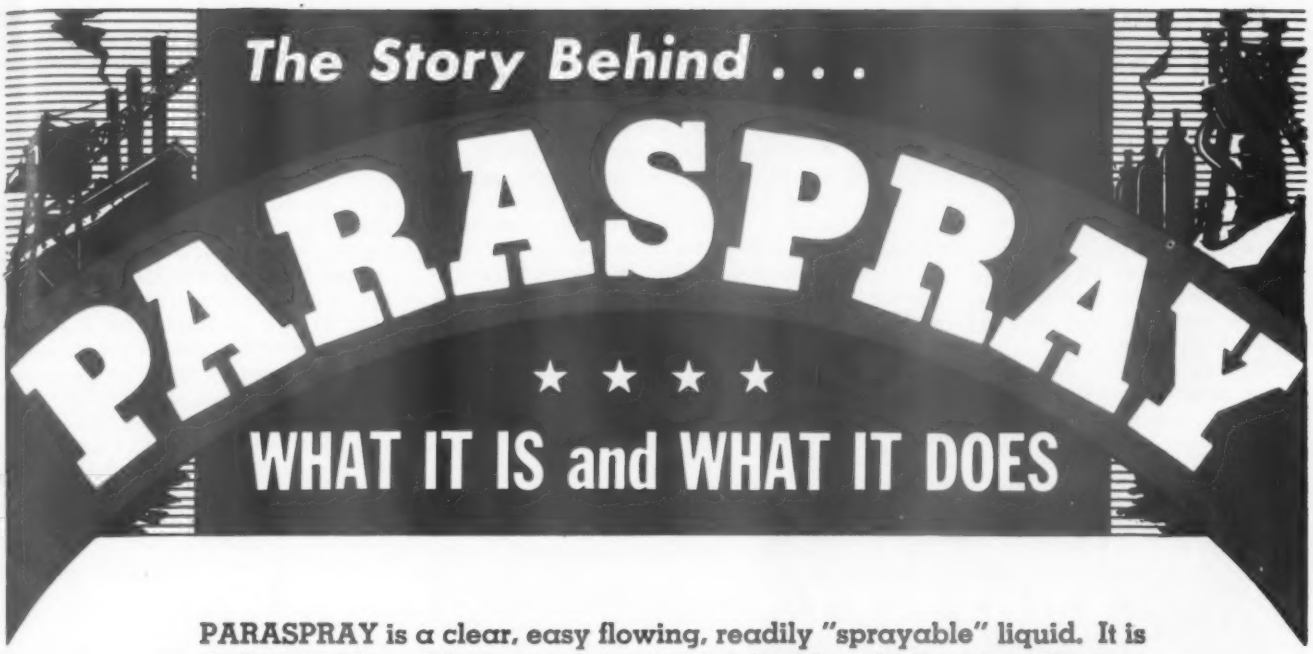
A. S. Campbell Co. Inc., East Boston, Mass., has taken control of Hunt-Spiller Mfg. Corp., South Boston, Mass. The latter for 134 years has been engaged in producing castings and armor for the United States in all wars since the Revolution, and built the first rifled cast iron gun in this country.

This merger unites a stamping shop, for 20 years engaged in automotive accessory manufacture, with a heavy foundry. Neil C. Raymond, president of the Campbell company, becomes head of Hunt-Spiller, succeeding V. W. Ellett, for 33 years with the latter firm as president. Frances W. Wheeler Campbell, vice persident, becomes vice president of Hunt-Spiller. Employing 600 people, Hunt-Spiller will continue under its own name with the facilities supplemented by machining capacity and floor space at th Campbell plant.

History of Hunt-Spiller, a manufacturing corporation since 1810 (established by Cyrus Alger) is interesting. It made cast iron cannon balls for the War of 1812. Heavy guns were cast for the Civil War, including the famous Columbiad the first Big Bertha, in 1842 with a range of over 2 miles. Guns on the MONITOR, used in the MERRIMAC fight, were made in this shop. Hunt-Spiller gun iron later was adapted for railroad equipment. Wheel centers on Old 999 for that locomotive's famous runs were cast at the South Boston foundry. The shop was first known as Alger's Foundry and later as South Boston Iron Works.

Casting Defects and Remedies Indicated

Eastern Clay Products Co., Eifort, O., has prepared and is distributing a circular cardboard dial which shows at a glance various types of casting defects due to condition of the sand, also the proper procedure for preventing these defects. The device is made up of two disks. Causes of casting defects—drop, cut or wash, scab, blow, pinholes, rat tails, rough casting, hot cracks—are shown near the perimiter of the larger circular member. By turning the slightly smaller card until an arrow at the edge points to one of the defects, a window shows the cause and remedy.



PARASPRAY is a clear, easy flowing, readily "sprayable" liquid. It is made from rubber, chlorine and our special, highly volatile solvent known as PARASOLV. It is used to spray on cores and molds before the metal is poured.

When the hot metal hits the "PARASPRAYED" surface of core and mold the thin PARASPRAY film decomposes forming carbonblack and chlorine gas. Good surfaces result and an ideal, oxygen-free atmosphere produced.

With aluminum casting the chlorine also combines with the surface aluminum oxides and acts as a fluxing agent to scavange all oxide inclusions. This permits gases to escape freely. PARASPRAY is a true hydrocarbon compound neither containing nor having any affinity for oxygen.

For the above reasons many of America's largest foundries find PARASPRAY indispensable. PARASPRAY has other valuable uses, such as a hardener for green sand cores and molds, a sealer to prevent moisture absorption, protective coating for chills and many other applications.

We are proud of the fact that our company, three years ago, operating under basic patent rights covering the use of rubber, synthetic rubber and rubber-like substances in foundry practice, originated the novel idea of the value of hydrocarbon chlorine compounds in foundry practice.

We have diligently, earnestly and fairly worked with and assisted foundries in cutting scrap losses and improving quality. Our efforts have been highly successful. If you have trouble, call on our Technical Staff. We may be able to help you, too.

PARASPRAY CORE & MOLD
PARASET CORE BINDER
PARACOAT FOR PATTERNS

Sole licensees under the Saeger Patents exclusively regulating the use of rubber compounds in making and spraying cores and molds.

FOUNDRY RUBBER COMPOUNDS CORP.

1050 - 30TH ST., N.W. WASHINGTON 7, D.C. REPUBLIC 2256

COPY'T 1943—FRCC

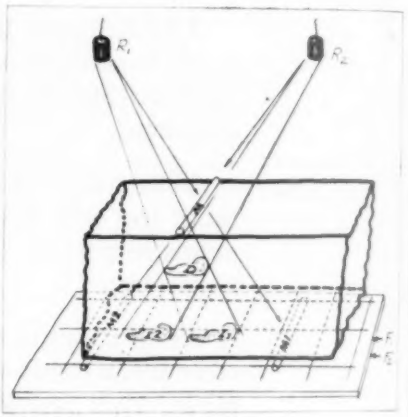
Determine Position Of Casting Defect

Suggestion for the location of defects in castings was submitted by Benjamin B. Burbank, Bath Iron Works Corp., Bath, Me., to War Production Drive Headquarters, Washington, and designated serial No. 2542. It is a method for speedy and accurate 3-dimensional location of defects by stereoscopic gamma ray radiography, involving use of a reference marker, a fixed grid, and two films separately exposed.

As shown in the accompanying sketch the reference marker, a strip of lead M, is taped to the source side of the casting. A grid made of crossed lead wires producing 1-inch squares is securely taped to the opposite side of the casting. Now if one film is placed against this grid, and the radium set at position R_1 which need not be determined accurately, an image of the lead marker M_1 and an image of the defect D will register upon it as I_1. If this film be removed and a new film F_2 be placed against the grid, a new image of the marker as M_2 and of the defect as I_2 will be recorded when the radium is set at position R_2.

To determine the position of the defect it is only necessary to make simple measurements of the relative displacements of the defect image and the reference marker image. If the marker is displaced 1 inch and the defect image ½-inch, then the defect is approximately halfway through the wall of the casting. Corrections of the thickness of the grid and film holder must be made, of course. Calculating the distance based on a point source of radiation mathematically, will show considerable error, but the radium capsule is not a point source; neither is an x-ray tube target. Both have sufficient size to overcome the theoretical error to such an extent that it becomes insignificant. Moderately careful measurements and study of detail on radiographs so made will place defects well within 1/16-inch of their exact locations.

Several instances can be cited where the method has saved the firm the cost and delay involved in removing unimportant defects in castings. That means a saving of time required to open castings to expose the defect, time and labor



Sketch showing locations of the marker, defect, grid and film to determine position of defective area in casting

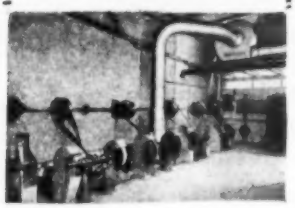
required to remove the defect, time of welding and material required to fill in the defect, delay of a second radiograph, and annealing furnace time. The items enumerated run into a great number of manhours on large castings.

The procedure outlined allows inspectors to decide definitely whether or not defects warrant opening the casting, making it possible to pass defects that otherwise would be removed at great cost and delay. Where it is necessary to repair defects found in castings, their accurate location by the described method means the saving of many manhours. The procedure is by no means limited to gamma ray as it applies equally well to x-ray radiography.

Receives Award

The Ordnance Department bestowed the Ordnance Distinguished Service Award to the Franklin Institute, Philadelphia, Sept. 13, in recognition of work done by the institute in developing weapons of increased precision and longer service life as well as for long-term technical advisory service in peacetime.

All right, Mister . . . maybe they shoot a little dust, but you won't have to eat it any more, and neither will machines, when you get a Sturtevant System on the job.



Snagging, tumbling and sandblasting output can be slowed aplenty by insufficient dust exhaust. If that's your trouble, get a Sturtevant System and with it — better dust collecting, enough suction to remove every vagrant particle, protection for men and machines. You'll see shop efficiency upswing. You'll get these advantages, too:

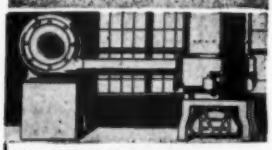
Over 80 years of air engineering experience enable Sturtevant to plan apparatus and systems for lowest operating cost. Greater suction with less power is the secret. Exclusive designs assure minimum space usage, and an installation that is performance-checked by a local Stutevant engineer accustomed to solving foundry dust and fume problems.

Call us in to survey your finishing department and show you...as we have shown many noted plants... just what can be accomplished.

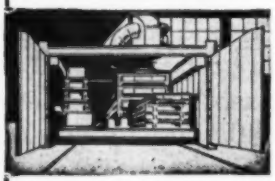
B. F. STURTEVANT CO., Hyde Park, Boston 36, Mass.

Sturtevant
REG. U. S. PAT. OFF.
Puts Air to Work

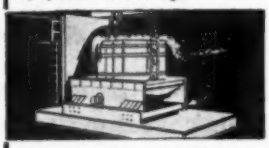
OTHER STURTEVANT PRODUCTS *tailor-made* FOR YOUR INDUSTRY



Sturtevant Cupola Blowers—assure smooth, constant pressure supply of air. Compact, simple, sturdy construction; sizes and types for all conditions.

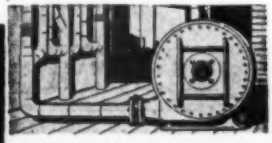


Sturtevant Core Oven Fans—handle dirty dust-laden air with no loss in efficiency. Shafts cooled by special "heat-slinger."



Sturtevant Foundry Shake-out Systems—completely control dust and fumes, increase worker efficiency and equipment life, cut down maintenance.

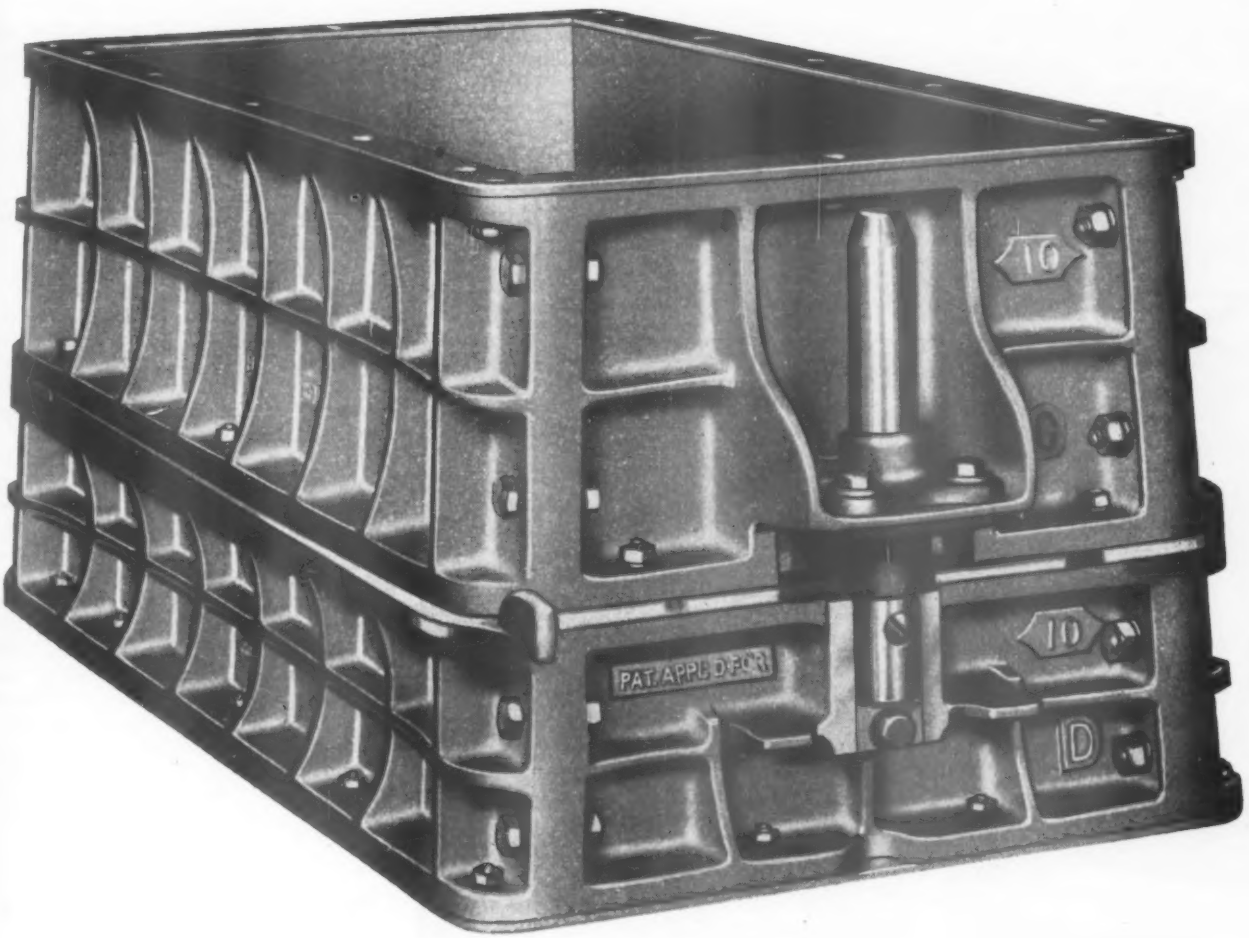
Sturtevant Fume Control—efficient tailor-made systems for production foundries or low-operating-cost equipment for jobbing shops.



Sturtevant Compressors—hold air pressure constant, in supplying blast to oil or coke burners. Lifetime efficiency, minimum maintenance; worthwhile power savings.

Fremont Flasks again available in MAGNESIUM METAL

PROMPT ATTENTION GIVEN ALL ORDERS



FREMONT FLASKS have established a reputation for efficiency and long wear and in most progressive foundries have replaced the old type, cumbersome. heavy weight equipment.

The FREMONT FLASK with the 1" GROOVLOCK PIN is especially adapted to snap work but can also be furnished with cast ears to accommodate other pins.

Slip Flasks FREMONT GROOVLOCK Jackets

THE FREMONT FLASK CO...FREMONT, OHIO

A.F.A. Elects Staff Officers

Officers of the American Foundrymen's Association headquarters staff were elected for the coming year at the recent annual meeting of the association's board of directors, held in Chicago, July 11-13. At the same time the directors created a new technical development program for the purpose of expanding the technical activities of the organization.

Staff officers elected were as follows: Secretary, Robert E. Kennedy; director of the technical development program, Norman F. Hindle, formerly assistant secretary; treasurer, C. E. Hoyt; assistant treasurer, Miss Jennie Reininga; business manager, William W. Maloney, formerly assistant secretary.

In broadening the association's technical scope, the technical development program will operate in accordance with the fundamental objectives already established. Its functions, in the main, will include:

1. Revision and publication of special books and pamphlets on specific phases of foundry practice.
2. Collection, review and correlation of published and unpublished data.
3. Promotion and coordination of investigations now being carried on by the association.
4. Establishment and development of broader library facilities.
5. Establishment of broader abstract and bibliographic services.
6. Development of material for presentation before association chapters and other engineering and technical groups.

As director of the program, Mr. Hindle will head the new setup under the general supervision of Secretary Kennedy, working with an advisory committee composed of three members of the board of directors and representatives from management, technical, and operating groups of the various branches of the industry. The advisory committee includes the following:

Chairman, S. V. Wood, president and manager, Minneapolis Electric Steel Castings Co., Minneapolis, a national director of A.F.A.; Max Kuniansky, vice president and general manager, Lynchburg Foundry Co., Lynchburg, Va., national director of A.F.A.;

Walton L. Woody, vice president in charge of operations, National Malleable & Steel Castings Co., Cleveland, national director of A.F.A.; Dr. D. Basch, consultant, General Electric Co., Schenectady, N. Y., representing the light metals; Hyman Bornstein, director of laboratories, Deere & Co., Moline, Ill., representing gray iron and malleable iron; George K. Dreher, vice president in charge of manufacturing Ampco Metal Inc., Milwaukee, representing brass and bronze; C. J. Freund, dean of engineering, University of Detroit, Detroit, representing educational interests; James H. Lansing, consulting engineer, Malleable Founders' Society, Cleveland, representing malleable iron; F. A. Melmoth, vice president in charge of operations, Detroit Steel Casting Co., Detroit, representing steel; H. S. Simpson, chairman of the board, National Engineering Co., Chicago, representing foundry equipment manufacturers.

DAYTON
SNAGGING WHEELS

For fast snagging with minimum wheel wear or operator fatigue specify Daytons. Preferred by hundreds of steel and gray iron foundries from coast to coast for years.

SIZE, SHAPE, GRAIN AND GRADE REQUIRED.
WRITE, PHONE OR WIRE.

SIMONDS WORDEN WHITE CO.
710 NEGLEY PLACE, DAYTON 7, OHIO

Winners in Abrasive Contest Named

Western Metal Abrasives Co., Chicago Hgts., Ill., producer of steel abrasives recently announced the winners of the recent contest conducted within the foundry industry for trade names of its products. Henry J. Trenkamp, Ohio Foundry Co., Cleveland, was awarded a war bond for his accepted trade name, "Sure Shot," on round shot. I. D. McCarthy, Lorain, O., was awarded a second bond for his suggested trade name of "Par-Grit," on crushed material. The company's new plant now is in full production, officials state.

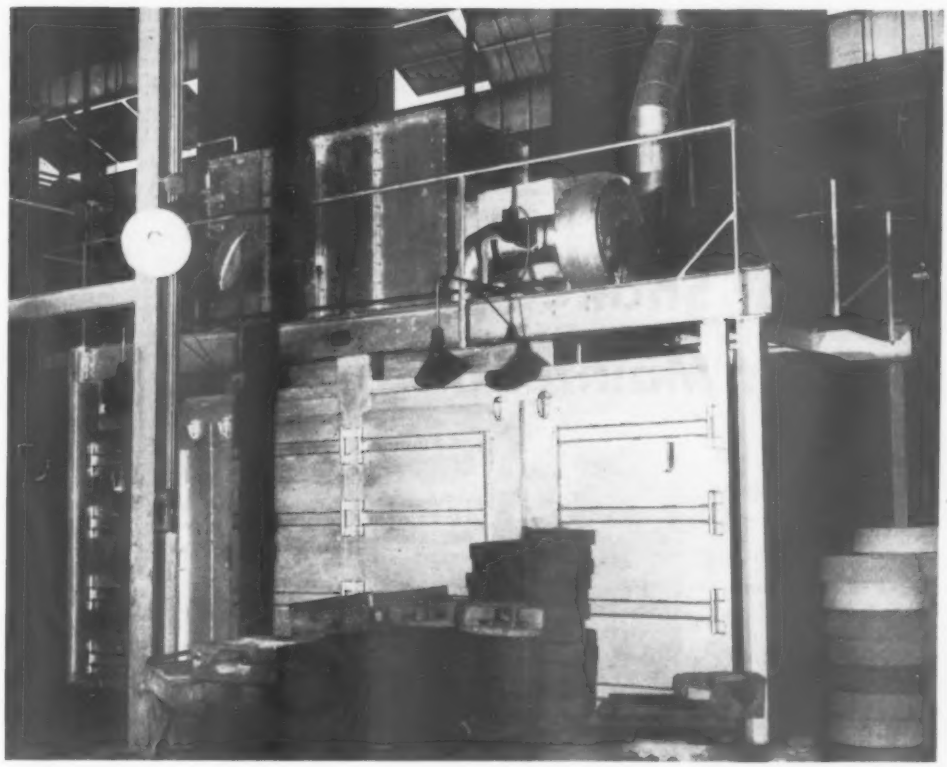
Opens New Office

Mechanical Handling Systems Inc., Detroit, builder of conveyorized manufacturing systems, has opened a new office at 1224 Commercial Trust Building, Philadelphia 2, with J. F. O'Hora as manager.

CARL MAYER CORE OVEN

In Use 19 Years and Good for Many More

CORE AND MOLD OVENS • ALL TYPES ALL SIZES



SERVING INDUSTRY OVER A QUARTER CENTURY

This rack type core oven was sold by Carl Mayer to Frank Foundries Corp. Moline, Illinois, Plant in 1925. It has recently been moved and equipped with convection heating after 19 years service. During peace and war it has continually baked cores. It will be used for post war, peace time production.

Carl Mayer recently designed and installed for Frank Foundries Corporation a horizontal recirculating gas fired continuous core oven for critical heavy truck castings.

This is a four pass continuous monorail core oven approximately 100′ long with a capacity of 18,000 lb. of cores per hour. Panel edges are channel, triple slotted Carl Mayer patented construction — Patent No. 1,843,430.

Many repeat orders indicate the confidence industry's leaders place in Carl Mayer creative engineering. Let us help you in planning the best oven for your core and mold baking requirements. Ask for Bulletin No. 141.

THE CARL MAYER CORPORATION, 3030 Euclid Ave., Cleveland 15, Ohio

Chicago District Representative, MR. LESTER SEELIG, 185 N. Wabash Ave., Chicago 1, Ill.
Western District Representative, MR. G. D. SCHOLL, 2108 Grand Avenue, Davenport, Iowa

SERVING CONCERNS LIKE *these:*

Aluminum Co. of America
American Magnesium Corp.
American Radiator & Standard Sanitary Corp.
Babcock & Wilcox Co.
Bridgeport Brass Co.
Bucyrus-Erie Co.
Brown Industries, Inc.
Dunkirk Radiator Co.
Eclipse Aviation Division of Bendix Aviation Corp.
Electric Autolite Co.
Ford Motor Co.
Fort Pitt Steel Casting Co.
Frank Foundries Corp.
Fremont Foundry Co.
G & C Foundry Co.
General Motors Corp.
General Electric Co.
Gilbert & Barker Mfg. Co.
Henry J. Kaiser, Inc.
Packard Motor Co.
Shenango Penn Mold Co.
Studebaker Corp.
United States Steel Corp.
Whiten Machine Works
Whiting Corp.

Truck Safety Rules Are Listed

As a contribution to the drive for reduction of accidents in industrial plants, the Elwell-Parker Electric Co., Cleveland, has formulated a set of safety rules for operators of power industrial trucks. These rules are intended to supplement the basic instruction of the operator and to interpret the general precaution to "Drive Carefully." It is pointed out that in most cases it would be advisable to modify them by specific reference to local conditions, such as observance of one-way routes, hints for checking loads before pick-up, and similar rulings.

Safety Rules for Power Trucks

1. *Move control levers firmly from one speed to another and without hesitation.* This is to prevent arcing, which pits the contact surfaces of the switch. If you allow these contacts to become damaged you may fail to get the expected response from your control lever at a time when you want it very much.

2. *Keep your load as low as possible when moving.* There is no danger of tipping a load carried at a low level. Keep it low enough so that you can see over it.

3. *Keep your truck behind the load.* If you should get off suddenly, or fall off, then the load will be moving away from you and it can do you no harm. When going up steep inclines it is sometimes better to reverse this position and have the truck pull the load.

4. *Avoid making quick or jerky stops.* The momentum of the load may play tricks on you. Be especially careful about stops when you have a load elevated for tiering or stacking.

5. *If your truck has a tilting device—use it.* By tilting the upright toward you the weight of the load is brought back slightly and the balance is improved. This slight tilt of 10 to 15 degrees will avoid spilling the load when rounding corners.

6. *Go easy when approaching danger points.* These are: elevator gates, pits, bridges, inclines, tunnels and tracks. Get the habit of crossing tracks diagonally instead of at right angles.

7. *Take a good look at your load before you pick it up.* If you have to move a doubtful load, *slow down.*

8. *Be sure to pick up every load squarely.* Then there is no danger of the load shifting, due to offside loading, while you are in motion. When small boxes in pallet or skid lots are raised above the uprights, be sure that those on the back corners have not shifted to fall on you. Insist on wide load back rests.

9. *Report rubbish on floors to your foreman.* You and your truck are safer on clean runways.

10. *Don't cut corners.* You are in danger of having to stop quickly—lose the load—hurt someone or damage the goods.

11. *Keep your truck clean.* Dirt and rubbish make your footing uncertain and may cause trouble if obstructions lodge somewhere in the mechanism.

12. *Don't carry passengers.* You need all the room you have, for perfect control of your truck.

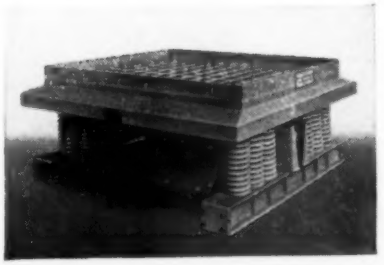
13. *Don't allow others to operate your truck.* They may injure someone, or damage the truck or tires. It takes time to get spare parts these days.

14. *Report need for repairs immediately.* Repairs take the least time when they are made promptly.

Speaking of Shakeouts . . . What About Maintenance?

Almost every time we mention Shakeouts, foundrymen ask, "What about maintenance?" Here's the answer:

In the five years that Robins Floatex Shakeouts have been made, there has not been a single major maintenance difficulty . . . not a single shaft has ever snapped . . . not a single main bearing has ever broken.



The picture tells you why. In the Robins Floatex Shakeout—and only in the Floatex—no part of the load is carried by shaft or bearings. Heavy duty, soft, coil springs carry the entire burden . . . the loaded flask, the vibrating frame and all.

That's why shafts and bearings do not snap or break . . . why you do not have to build heavy foundations to sustain the Floatex . . . why you save money—right from the initial installation—when you buy a genuine Robins Floatex Shakeout.

And When It Comes To Action!

— the Floatex has shaken-out a 4-ton flask in 20 seconds, a 40-ton flask in 50 seconds, a 75-ton flask in 105 seconds. In fact, the Floatex will handle any size flask . . . from 100 lbs. to 100 tons or more . . . with speed, efficiency and thoroughness that are truly amazing.

Don't take our word for it. Ask us for the names of Floatex owners in your territory. Then put the matter up to them. We'll supply the list—and any other facts you desire. Please address Dept. F-10.

ROBINS *makes:* BELT CONVEYORS • COAL AND ORE BRIDGES • BUCKET ELEVATORS • CAR AND BARGE HAULS • CAR DUMPERS • CAR RETARDERS • CASTINGS • CHUTES • CONVEYOR IDLERS AND PULLEYS • CRUSHERS • FEEDERS • FOUNDRY SHAKEOUTS • GATES • GEARS • GRAB BUCKETS • PIVOTED BUCKET CONVEYORS • VIBRATING SCREENS • SCREEN CLOTH • SELF-UNLOADING BOAT MECHANISMS • SKIP HOISTS • STORAGE AND RECLAIMING MACHINES AND SYSTEMS • TAKEUPS • LOADING AND UNLOADING TOWERS • TRIPPERS • WEIGH LARRIES • WINCHES • WINDLASSES

FOR MATERIAL AID IN MATERIALS HANDLING . . . . . It's ROBINS

ENGINEERS • MANUFACTURERS • ERECTORS

ROBINS CONVEYORS
INCORPORATED
Founded in 1896 as Robins Conveying Belt Co.
PASSAIC • NEW JERSEY

MATERIALS HANDLING MACHINERY

Magnesium Founders Will Meet

First annual meeting of the Magnesium Association will be held Oct. 3 and 4 in New York at the Waldorf-Astoria hotel. Outstanding leaders of the industry will address the first session on Tuesday morning. Afternoon meeting will be devoted to a business session also open to members and guests. Sand Cast Division of the association is planning an interesting program for Wednesday, Oct. 4. Perry D. Helser is secretary-director of the association and located at 30 Rockefeller Plaza, New York.

Metal-cutting tools remain in tight supply, according to WPB, June shipments of $23,269,000 continuing behind new orders of $25,797,000. This raised unfilled orders to $53,775,000, highest in 4 months.

Super-Duty IRONTON BERLITE

REFRACTORY BONDING MORTAR FOR FOUNDRIES

"Ironton Berlite", with its high refractoriness and its resistance to molten metal and metallic oxides, prevents joint erosion and premature failure of the fire brick lining in foundry melting furnaces. Many foundries are enthusiastic about the performance of this special purpose, super-quality refractory bonding mortar.

It is used for laying up cupola blocks in the well and melting zone, for laying up malleable sidewall and bung brick, for laying up fire brick and high alumina brick in electric furnaces and for brick lined ladles. It is also useful as a tamped or mud ladle lining. It is giving better service in non-ferrous melting furnaces than any other product on the market.

May we send you a circular on "Ironton Berlite"?

For greater brick life and better furnace efficiency, use "Ironton Berlite".

Address Box 309

THE IRONTON FIRE BRICK COMPANY

RELIABLE REFRACTORIES

IRONTON OHIO

COKE PROPERTIES AND CUPOLA MELTING

(*Continued from page* 79)

combustion of the coke with air. As generally written these reactions are as follows:

1. C	$+ O_2 =$	CO_2	+14,550 B.t.u.
2. 2C	$+ O_2 =$	2CO	+ 4,350 B.t.u.
3. 2CO	$+ O_2 =$	$2CO_2$	+10,200 B.t.u.
4. CO_2	$+ C =$	2CO	− 5,850 B.t.u.
5. 2CO	$=$	$CO_2 + C +$	5,850 B.t.u.

In each instance the B.t.u. shown is the amount of heat released per pound of carbon. Equation 2 is the final result of two reactions as follow:

First Stage	$C + O_2 = CO_2$
Second Stage	$CO_2 + C = 2CO$
Final	$2C + O_2 = 2CO$

Now the important point concerning these reactions is that they represent individual equilibrium conditions while in the cupola we have dynamic conditions under constant change and some of these reactions oppose each other. This means, of course, that each of these reactions proceeds in accordance with the conditions favorable to it and in magnitudes consonant with overall influences, so that the end products in the cupola represent a composite of the several reactions.

Simplicity of these reactions as written with no further explanations is very misleading for they do not permit proper interpretation of the possible magnitude under the conditions of actual operation. The point is this, these reactions all proceed at entirely different rates, for instance, reaction No. 1 at 1800 degrees Fahr. proceeds almost instantaneously while reaction No. 4 at this same temperature is considerably slower. Reaction No. 5 is the reverse of reaction No. 4 and at 1562 degrees Fahr. proceeds at a rate 166 times slower than reaction No. 4. We have already mentioned that reaction No. 2 is a resultant of two reactions rather than a direct reaction as written. If this is so, then reaction No. 3 cannot take place except in some minor capacity. In actual operation when CO is formed, as under reaction No. 4, in the upper part of the stack above the bed, no oxygen is present so that for the most part the CO remains as such in the final effluent gases. For a more complete discussion of the mechanisms involved the reader is referred to Haslam & Russell[3].

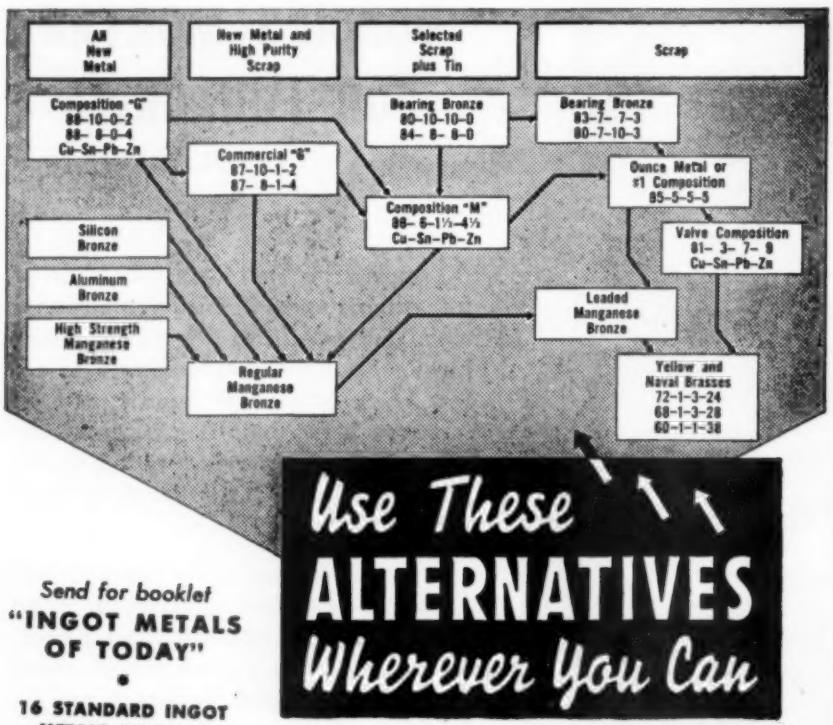
Coke Is Only One Factor

In the discussion of heat balances of cupola operations and potential thermal efficiencies, all too frequently the impression is created that coke is the sole responsible factor in this connection, and that no improvement can be effected until the coke itself is changed in character. This is far from the truth and must be thoroughly understood if we are to obtain a fair and equitable appraisal of cupola melting. Of the reactions shown, No. 1 and No. 4 are the most important and when properly considered will help materially in understanding the combustion process and subsequent melting.

It is obvious, for instance, that maximum thermal efficiency can be obtained only when all of the coke is burned to CO_2 with no subsequent decomposition. It is not obvious though why this does not or cannot take place under actual operating conditions.

Referring again to Fig. 2, after the air leaves the tuyeres the initial velocity and direction tends to drive the air toward the center of the coke bed but the texture of the entire burden above this point immediately imposes its influence. The distribution of gaseous pressure will, of course, determine the direction of flow and while some gas is being passed upward in each section of the cupola, the velocities and rates are not distributed evenly across the cupola area, resulting in the zone of maximum temperature forming the shape of an inverted cone. Of extreme importance is the fact that in all cupolas the line of least resistance to flow is at the periphery. It is in this diagonal direction that reaction No. 1, $C + O_2 = CO_2$ proceeds vigorously. Size of materials, and rate of blowing alter the degree of flow, but do not change this imposed direction.

Gases leaving this zone of maximum temperature come in contact with the


All New Metal
New Metal and High Purity Scrap
Selected Scrap plus Tin
Scrap
Composition "G" 88-10-0-2 88- 8-0-4 Cu-Sn-Pb-Zn
Commercial "G" 87-10-1-2 87- 8-1-4
Bearing Bronze 80-10-10-0 84- 8- 8-0
Bearing Bronze 83-7- 7-3 80-7-10-3
Ounce Metal or #1 Composition 85-5-5-5
Composition "M" 88- 6-1½-4½ Cu-Sn-Pb-Zn
Valve Composition 81- 3- 7- 9 Cu-Sn-Pb-Zn
Silicon Bronze
Aluminum Bronze
High Strength Manganese Bronze
Loaded Manganese Bronze
Regular Manganese Bronze
Yellow and Naval Brasses 72-1-3-24 68-1-3-28 60-1-1-38

Use These **ALTERNATIVES** *Wherever You Can*

Send for booklet
"INGOT METALS OF TODAY"

16 STANDARD INGOT METALS BY AJAX

Ajax Tombasil
Ajax Plastic Bronze
Ajax Anti-Acid Bronze
Ajax Phosphor Bronze
Ajax Red Brass Ingots
Ajax Manganese Bronze
Ajax High-Tensile Manganese Bronze
Ajax Golden Glow Yellow Brass
Ajax-Hamilton Gear Bronze
Ajax Nickel-Copper 50-50%
Ajax Manganese Copper
Ajax Aluminum Alloys
Ajax Phosphor Copper
Ajax Silicon Copper
Ajax Nickel Alloys
Ajax Phosphor Tin

NOTE

*"Proper Melting Decreases Foundry Losses," contains interesting data. Also, the booklet, "Nonferrous Ingot Metals of Today." Write for both of these. They are free.

Notice how the arrows on the W.P.B. chart point to the *right*. . . . They show how alternative materials *currently available* can be utilized by foundrymen as now permitted by many designers. The purpose is to conserve primary metal at the mine through increased use of secondary ingots. Sometimes great ingenuity is called for, yet remember this:

The first program for scientific control of ingot metal was set up by Ajax 45 years ago. The result has been metal and practical technical follow-through in which Ajax increases your production by reducing rejects.

THE AJAX METAL COMPANY
ESTABLISHED 1880 PHILADELPHIA

ASSOCIATE COMPANIES:
AJAX ELECTRIC FURNACE CORP. Ajax-Wyatt Induction Furnaces for Melting
AJAX ELECTROTHERMIC CORP. Ajax-Northrup High Frequency Induction Furnaces
AJAX ELECTRIC CO., INC. The Ajax-Hultgren Electric Salt Bath Furnace
AJAX ENGINEERING CORP. Ajax-Tama-Wyatt Aluminum Melting Induction Furnaces

iron charge on top of the bed and these gases are responsible for melting the iron, not the coke in contact with the iron. The gases continue upward through the remaining coke and iron charges and reaction $C+CO_2=2CO$ (all O_2 has been expended in correct practice) commences immediately above the bed but decreases in intensity as the temperature decreases. This reaction absorbs 5850 B.t.u. for each pound of carbon thus reacting. The sensible heat of the gases is absorbed partially by the descending stock in the form of preheat. The remaining sensible heat in the gases above the stock line is, of course, lost.

It was mentioned that size of material influences direction of flow of gases, but it also affects quantity of heat absorbed in the preheating zone. For example, a 250-pound piece of solid iron cannot absorb as much heat in the time allotted as 10 pieces of the same material each weighing 25 pounds, because of the difference in surface exposure. It is evident then that the actual heat content of the iron at the time it reaches the melting zone is a function of material size and naturally will influence its rate of conversion from the solid to the liquid state.

Resultant effect of the direction of flow is illustrated clearly in Belden's[3] work which is summarized in Table I.

Analyses From Coke Bed

These analyses were taken from a burning coke bed (approximately 3 feet total depth) in a cupola lined to 27 inches with air delivered at a rate of approximately 1000 cubic feet per minute. Size of the coke used was 3 inches and under. Position of the planes are as follows: A 1 inch above tuyere; B 7 inches above tuyere; C 13 inches above tuyere; D 19 inches above tuyere, and E 26½ inches above tuyere.

The location of the sample points as measured from the lining are as follows: 1 Center 13½ inches from lining; 2 9 inches from lining, and 3 4½ inches from lining.

Of particular interest is the percentages of O_2 at point 3 in each one of the planes, beginning at the tuyeres this shows 15.8, 8.9, 4.9, 0.4 and 0.1 per cent. This decreasing concentration clearly reflects the controlling direction of flow of the gases. Of additional interest and considerable moment is the fact that CO exists in all planes. This is clearly indicative that both reactions No. 1 and No. 4 are occurring almost simultaneously even in plane A the region of maximum O_2 concentration. This illustrates the impossibility of reaction No. 1 occurring to the exclusion of No. 4, and therefore, we cannot expect the maximum theoretical amount of heat from the coke to be made available.

One more point of note is the increase in the CO content as the gases rise. This occurs after the O_2 has been consumed, permitting reaction No. 4 to progress more rapidly.

In Table II[4] are shown some calculated compositions of the gases under ideal conditions and this data is plotted in Fig. 1. Quantities are adjusted for a coke of 92.5 per cent carbon content.

A normal quantity of limestone used will increase the CO_2 by something less than 1 per cent over the entire range.

The example shown in Fig. 1 is interpreted as follows: The final average gas analysis is CO_2—14.0 per cent, CO—11.5 per cent, the air required for this condition of combustion is 108 cubic feet per pound of coke and the total heat released is 9200 B.t.u. per pound of coke.

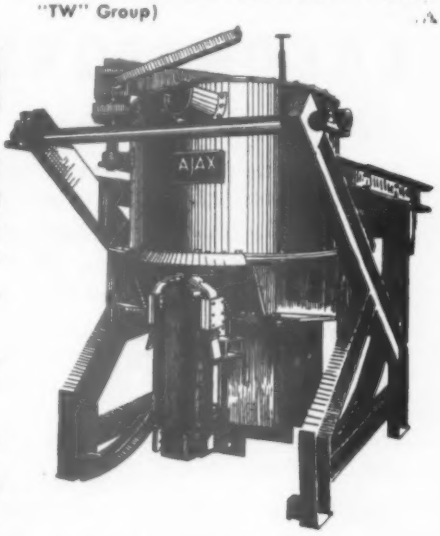
On Fig. 1 also is shown the suggested average working range of CO_2 from 11 to 14 per cent. Above 14 per cent CO_2 the danger of oxidation of the metal is grave. This happens where the coke per charge is too low, or the combustion zone is too narrow. Below 11 per cent the coke per charge is too high, with resultant poor coke economy, slow melting rates, high carbons generally and oftentimes low metal temperatures.

Final point in this discussion is that the quantity of air required for combustion cannot and should not be calculated on the basis of all of the coke burning to CO_2, because this does not take place; only part of the total B.t.u. content of the coke can be recovered, because of the CO, CO_2 reactions occurring simultaneously, and finally, of extreme importance is the fact that the air required and the heat released are a function of the path of travel of the air and the gases.

PLANTS NOW MELTING ALUMINUM ALLOYS ELECTRICALLY ENJOY THESE SPECIFIC ADVANTAGES...

1. **VASTLY INCREASED PHYSICALS** (tensile strength and elongation) in foundry, die-cast, or rolling mill products.
2. **DECREASED GAS ABSORPTION AND SEGREGATIONS** hitherto due to conventional melting practice.
3. **CLEAN-CUT, ACCURATE TEMPERATURE CONTROL** during the melting and pouring stages.
4. **GREAT EASE AND SIMPLICITY IN HANDLING ALLOYS** that were once considered sensitive and difficult to melt.
5. **ELIMINATION** of oxide inclusions.
6. **COOL AND CLEAN** foundry operations.
7. **DELIVERY** of the rated production per hour on the hour, (production capacity 300 lbs. to 1250 lbs. per hour).

This is the first commercial electric furnace for melting aluminum alloys in continuous operation. It utilizes the famous Ajax-Wyatt low-frequency induction melting principle which has been applied successfully for nearly all wrought brass melted throughout the world. Write for new bulletins . . . (The "TW" Group)



AJAX ENGINEERING CORPORATION, Box 1418, Trenton 7, N. J.

THE AJAX TAMA-WYATT INDUCTION MELTING FURNACE

ASSOCIATE COMPANIES. AJAX METAL COMPANY, Non-Ferrous Ingot Metals and Alloys for Foundry Use
AJAX ELECTROTHERMIC CORP., Ajax-Northrup High Frequency Induction Furnaces
AJAX ELECTRIC CO., INC., The Ajax-Hultgren Electric Salt Bath Furnace
AJAX ELECTRIC FURNACE CORP., Ajax-Wyatt Induction Furnaces for Melting

due to inherent characteristics of the process and the medium employed.

Direction and magnitude of the reactions discussed can be modified by several factors which, although not changing the fundamental relationship, may seriously affect quality of metal. These factors will be reviewed briefly and the simplest manner of their presentation will be to discuss a recommended procedure pointing out the effects encountered when digressing from the principles outlined.

In presenting the following recommendations the principal objectives are: 1. Clean iron of desired composition and physical properties. 2. Minimum oxidation of the metal. 3. Spout metal temperatures not less than 2750 degrees Fahr. 4. Reproducibility of results with a minimum of deviation. 5. Optimum melting rates commensurate with cupola size. 6. Reasonable coke ratios.

The features recommended are as follows:

A. The Cupola

Suggested height is 16 feet to 22 feet. Low limit of 16 feet may appear too low, but for cupolas 42 inches and less this height can be made to function properly. No cupola within the range of diameter normally encountered need exceed 22 feet in height, first, because any additional height is of doubtful value for greater heat recovery; secondly, a greater height creates a higher back pressure which aggravates peripheral gas travel; and third, time of stock descent is increased making it more difficult to effect a change when required.

The cupola should have a straight, vertical lining. Boshing should be avoided because of decreasing the effective melting area unless this is the objective. A bosh usually is employed on long heats to avoid damage to the shell. Oftentimes a deep burnout even on a long heat is avoidable by modification of the practice or equipment. A protective ledge extending over the tuyeres for a distance of 4 to 6 inches toward the center is advisable in many instances to assist in keeping tuyeres clean and to permit deeper penetration of the blast. All boshes should taper gradually to the lining, to avoid sharp ledges.

The well should be the same diameter or slightly larger than the shaft. Its depth with rear slagging should not exceed 24 inches from the sand bottom to the lower plate of the tuyeres. A minimum depth is difficult to recommend because of the many different requirements. It should be mentioned, however, that the well is not the zone of high carbon absorption usually believed. It is really a deoxidizing zone, when properly designed.

Prefer Front Slagging Spout

Where it can be employed a front slagging spout is preferable, principally because it eliminates many troubles from enlarging slag holes, and excessive air loss. From the standpoint of regularity of composition, continuous tapping is preferred to intermittent tapping.

Continuous tuyeres are preferred to intermittent tuyeres because they permit a more uniform distribution of air around the entire circumference. Their design should be as simple as possible. The tuyere area in most instances can well be restricted to the range of 16 to 28 per cent (of the cupola cross section) the area diminishing as the cupola area increases. Single rows of tuyeres are advocated. More than one row cannot alter the fundamental factors already outlined, and no advantage of thermal efficiency, melting rates or temperatures can accrue from their use which cannot also be accomplished with a single row.

B. Air

Air used for the process in most instances is not given sufficient consideration. It is not generally appreciated but the quantity of air required, by actual weight, is just about the same as the iron melted. It can be and should be measured as carefully as all the other raw materials.

We already have pointed out the necessity for using the proper quantity of air to create the proper combustion conditions, but the practical accomplishment of measuring and distributing this quantity now requires discussion.

An air-weight control system is no guarantee that the correct amount of air is being used. In the first place, if the

(*Continued on page 206*)

LABORATORY SERVICE

CHEMICAL — PHYSICAL

Accuracy, rapidity, and reasonable cost characterize KAWIN FOUNDRY ADVISORY, METALLURGICAL, AND LABORATORY SERVICE. Tests available in unit or agreement basis. We invite inquiries regarding the manner in which this will fit into your operating program. Materials regularly tested for foundry clients are—

IRONS	ALUMINUM	COKE, COAL	MINERALS
STEEL	WHITE METAL	FUEL OIL	SAND
BRASS	BABBITT	FLUXES	CORE OIL

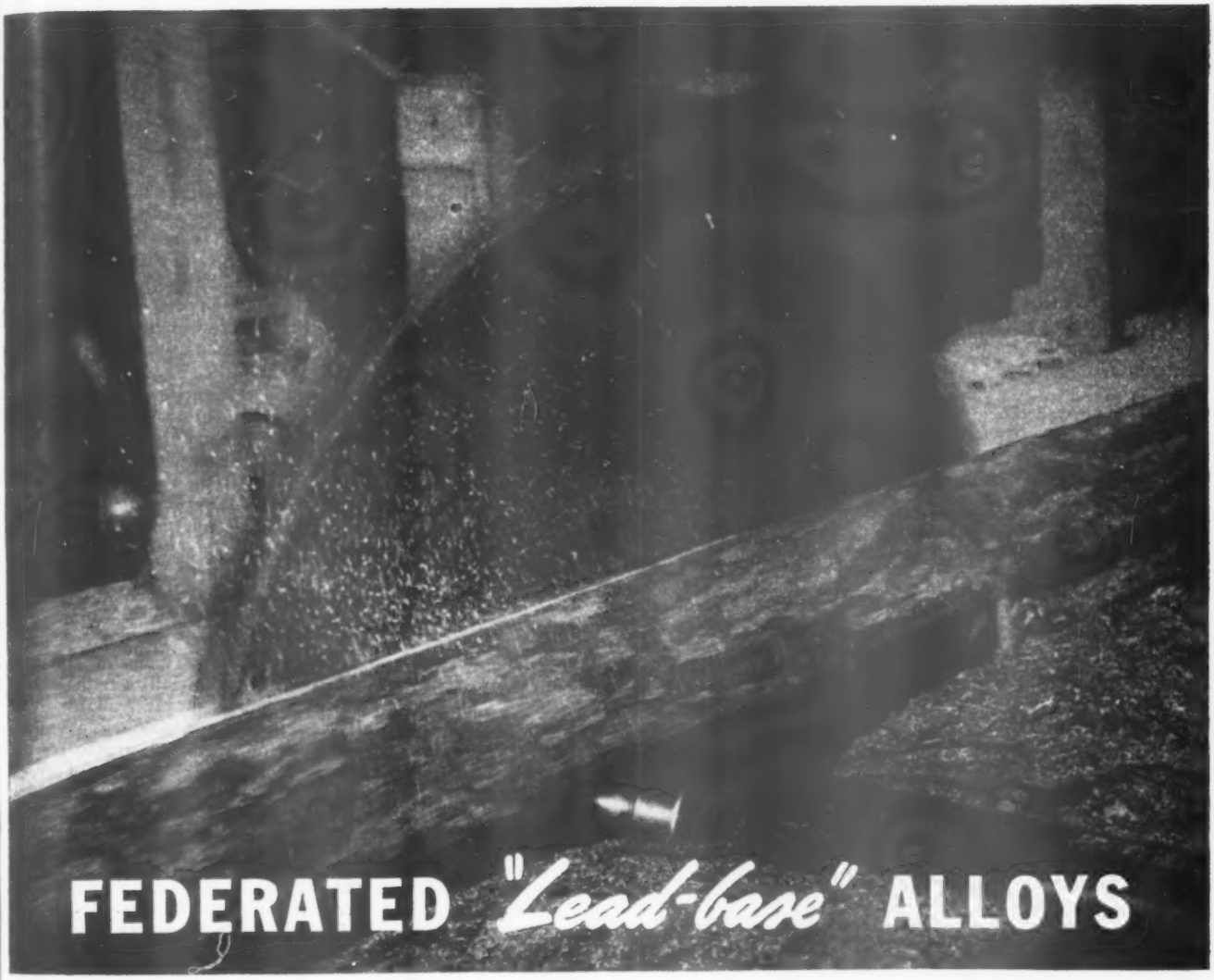
We provide facilities for mailing samples. Reports made by code, wire, telephone, or mail as you wish.

Over 40 years' experience in all types of foundry work. Why not drop us a line and learn how we may serve you by our well rounded organization?

Chas. C. Kawin Company

Chemists—FOUNDRY ENGINEERS—*Metallurgists*

CHICAGO—431 So. Dearborn BUFFALO—110 Pearl St.



STAND UP AND TAKE IT!

Federated *lead-base* alloys, particularly adapted for the heavy machinery employed in the logging and timber industry, are able to "stand up and take it" in today's continuous logging service. In fact, wherever wheels turn there is very likely a Federated lead base bearing alloy that will do the job. They offer these advantages:

1. Properties comparable to tin-base alloys
2. A method of application which prevents loose bearings
3. Easily lubricated
4. Resist fatigue at high temperatures
5. Highly stable
6. Cost 75% less
7. Available without priority

Order through your jobber or from the Federated office nearest you.

INGOT METALS AND WHITE METAL ALLOYS PRODUCED BY FEDERATED

ALUMINUM
BRASS
BRONZE
DIE CAST ALLOYS
SOLDER
BABBITT
TYPE METAL
ZINC DUST

All of these in standard specifications. Special alloys to your order.

FMD

Federated

METALS DIVISION

AMERICAN SMELTING and REFINING COMPANY

120 BROADWAY, NEW YORK (5) N. Y.

Nation-wide service with offices in principal cities

(*Continued from page* 204)

equipment is not installed properly or maintained in good working order, the readings reported may be entirely erroneous. Air, because of its extreme fluidity, is difficult to measure, and for this reason all equipment for this purpose should be installed only in accordance with established engineering principles.

For example, with a positive pressure blower and an orifice meter, the meter plate must be installed to conform to the correct distances from turns or bends. The entire air system must be tight, and if rear slagging is used, the slag hole should not be allowed to change size during the day, and further any escaping air must be allowed for in gaging the quantity of air used.

The air from the wind box to the tuyeres must be balanced. A repeating greater burn-out in one or more sections of the cupola than in others is indicative of excess air at these points. This results in unequal combustion in the bed with its many consequent ills of excess coke, low carbon, oxidation, etc. This unequal burning occurs with either one or two lines to the wind box and should be checked and corrected under all conditions.

High wind box pressures are undesirable and in most instances are caused by excessive charge density or a driving rate of the cupola in excess of its reasonable capacity. With high blast pressure, in almost every instance, excessive lining burn-out is encountered close to the tuyeres with consequent difficulty of maintaining proper metal composition. Higher coke ratios under these conditions will not eliminate oxidized iron or low carbons.

The maximum recommended pressures, even for the larger cupolas is 16 ounces to 24 ounces and the blower should be of sufficient capacity to permit this operation. Under most conditions lower operating pressures are desirable.

High charge density is undesirable for it invariably causes a greater quantity of the gases to travel a path close to the periphery. This in turn is reflected in a narrow path of travel of the air through the bed. This results in a very unequal distribution of temperatures throughout the bed, uneven melting and, above all, areas of high oxidation. This same condition results when a cupola is driven beyond its normal capacity.

Air pressure at the wind box as conventionally measured can be of considerable assistance in indicating changes occurring during a heat. Frequently, in fact, it is the only means available. One of its uses, however, should not be as a substitute for a volume gauge, for the pressure registered is a function of several factors and not just volume flow.

Air Expands in Wind Box

Mechanism of the flow of air in a cupola system is not very simple. Air leaves the blower at a given pressure, which is maintained, with little loss if the line is tight, until it reaches the wind box. Here it expands into the larger chamber and in doing so its velocity decreases. In its passage around the wind box some air is delivered to each tuyere, and this air lost is replaced by a constantly renewed supply from the blower, so that a dynamic equilibrium is established. This equilibrium, however, is not necessarily of equal magnitude in all sections of the wind box or in the quantities of air delivered through each tuyere. It is true that, in this distance, rate of flow is a function of the static pressure while in other cases total pressure is the factor to be considered and total pressure is the sum of velocity pressure and static pressure. The U gauge on the side of the wind box does not measure total pressure or velocity pressure or static pressure only. It does measure all of the static pressure and some velocity pressure at that particular point. At some other point on the wind box it could very well give a different reading when the rates of flow through the tuyeres are of different magnitude.

In the conventional tuyere, which has a larger area at the lining face than at the throat, we have a decrease in velocity due to this expansion across the tuyere depth. In a continuous tuyere, where the opening at the lining connects directly with the wind box around the whole circumference, we have an in-

(*Concluded on page* 208)

WOODISON'S

6

QUALITY PRODUCTS AID CASTING PRODUCTION

★

CORE OIL

★

PARTING

★

CORE PASTE

★

CORE WASH

★

CORE COMPOUND

★

SEA COAL

★

Woodison

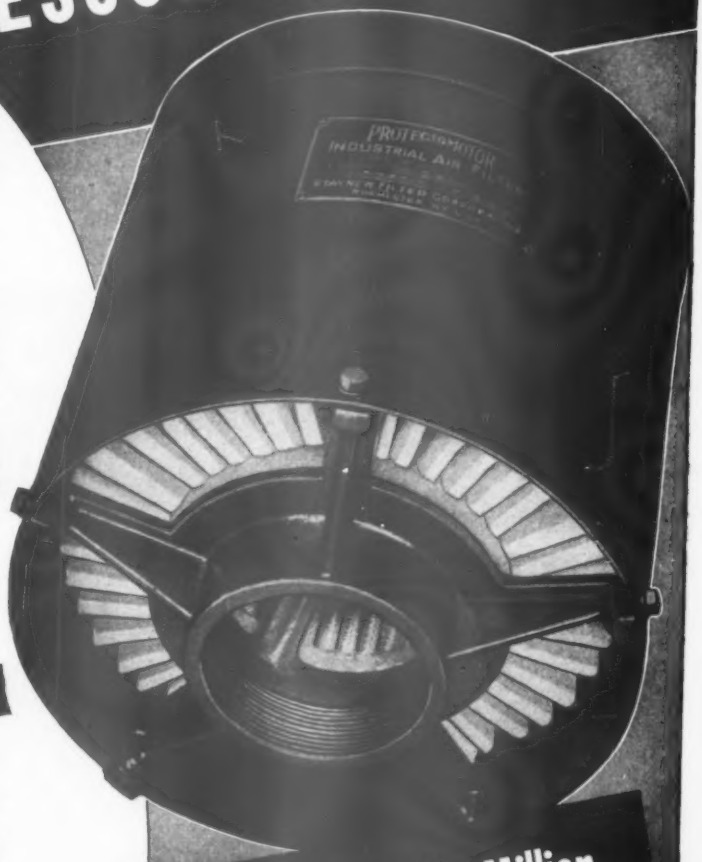
E J W CO.

THE E. J. WOODISON CO.

7515 St. Aubin Detroit, Mich.

Branches: Buffalo and Philadelphia

WHY PROTECTOMOTOR INTAKE FILTERS ARE BEST FOR AIR COMPRESSOR USE ★ ★



★ HIGH EFFICIENCY WHEN INSTALLED

Protectomotor Air Filters for internal combustion engines and compressors feature dry-type filtering media. These media are selected to fit particular installation conditions. They have been scientifically tested in the laboratory and proven by field use. Used in combination with the patented Radial Fin Insert Construction, they provide highest operating efficiency.

★ INCREASED EFFICIENCY WITH USE

Protectomotor filtering efficiency actually *increases* when dust begins to accumulate on the surface of the media, since this forms a precoating or filter-aid of the very material which is being handled.

★ LOW RESTRICTION TO AIR FLOW

Protectomotors at maximum ratings offer initial resistance to air flow of less than ½" of water. Since the exclusive Radial Fin Construction provides a maximum of filtering area, this resistance is held to a minimum throughout the life of the filter.

★ SERVICING SELDOM NECESSARY

The Protectomotor is a masterpiece of simple, rugged construction. There are no moving parts, no reservoirs, no liquids. The extremely large active filtering area reduces cleaning to an absolute minimum for any given set of conditions. When required, cleaning is quickly and easily accomplished by vacuum, compressed air, or washing.

★ POSITIVE PROTECTION ★ ★ ★ ★

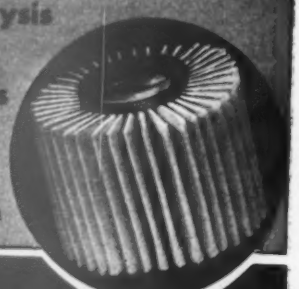
Inherent characteristics of the dry-type filtering media provide *positive* protection. Performance is *not* dependent upon periodic renewal of viscous coatings or other filter aids. Ideal for dust storm areas.

★ EFFICIENT AT HIGH OR LOW TEMPERATURES

As the filtering media used are of the dry-type, peak efficiency is maintained under all atmospheric conditions. There is no oil to evaporate at high temperatures or to congeal at low temperatures.

More than Half a Million Installations on Internal Combustion Engines and Compressors since 1920

Write for Catalog and Data Blank for Free Analysis of your Requirements



Radial Fin Construction

STAYNEW PROTECTOMOTOR FILTERS

DOLLINGER CORPORATION
(Formerly Staynew Filter Corp.)
36 Centre Pk., Rochester 4, N. Y.

(*Concluded from page 206*)

crease in velocity from the throat to the lining face of the tuyere because of a reduction in area. In this latter instance, all other factors remaining the same, we could expect a greater bed penetration because of the higher tuyere face velocity.

Size of the plenum chamber or wind box on any cupola is not sufficiently large, with the quantities of air used, to create the equality of pressure desired, nor are these wind boxes in constant ratio on all cupolas. This results in wide variations in velocities for different installations and, therefore, different pressure conditions even with the same total quantities of air delivered originally.

For any individual installation pressure readings may indicate relative rates of flow, but pressure measurements from different cupolas are not comparable for we have encountered many different cupolas of the same size and using the same quantities of air showing wind box pressures ranging from 8 to 36 ounces.

There is one other point of interest in this discussion, namely, that when the charge density is high enough to be the influential factor in regulating the rates of flow across the cupola areas, a reduction in the tuyere area in an effort to increase the velocity for better penetration, will be ineffective.

REFERENCES

1. Gillett, H. W., Battelle Memorial Institute "Metallic Materials"—Reprinted from *Steel* 1944, p. 15, 130.
2. Haslam and Russell, *Fuels and Their Combustion*, McGraw-Hill Book Co.—1926, p. 151 Et. Seq.
3. Belden, A. W.—*Foundry Cupola Gases and Temperatures*, United States Bureau of Mines Bulletin No. 54, 1913, p. 13.
4. Campbell and Grennan, "Control of Cupola Operation." *Transactions* A.F.A. 1935, p. 231.

(*To be concluded*)

8 OUT OF 10 are repeat orders

Transite Core Plate Users come back for more!

HERE'S why Johns-Manville Core Plate changes one-time buyers into long-time customers:

Light Weight: Transite Core Plates light weight means easier handling, increased production.

Less Breakage: Their fibrous nature provides unusual shock resistance, minimizes breaking and cracking.

Easily Cleaned: Transite Core Plates are actually self-cleaning when both sides are used alternatively.

Economical: These J-M plates combine low initial price, low handling costs and long life.

Low Warpage: Maximum warpage on plates under 24″ is 1/64″ on either dimension. On plates over 24″, warpage will not exceed 1/64″ in 24″ length and width.

Corrosion-Resistant: These Transite plates are made of an asbestos and cement combination. They cannot corrode.

Non-Metallic: No critical materials used.

Write for Brochure PP-10A. Johns-Manville, 22 E. 40th St., New York 16, N. Y.

JOHNS MANVILLE JM PRODUCTS

Johns-Manville TRANSITE Core Plates

Know Your Costs

(*Concluded from page 89*)

curately and include all departmental and a proper share of general and administrative expenses.

More attention must be given to depreciation of assets. The industry, in general, has been too conservative in writing off these items. With the increased demand for modern and special equipment bound to come in the post-war period adequate reserves must be set up against ordinary wear and obsolescence.

In estimating prices, reference should be made to a standard cost to reflect defective casting losses. In partnerships and proprietorships, executives' compensation must be treated as cost in lieu of the present practice of some foundries to consider it profit. Wherever possible labor incentive plans should be utilized effectively to increase production.

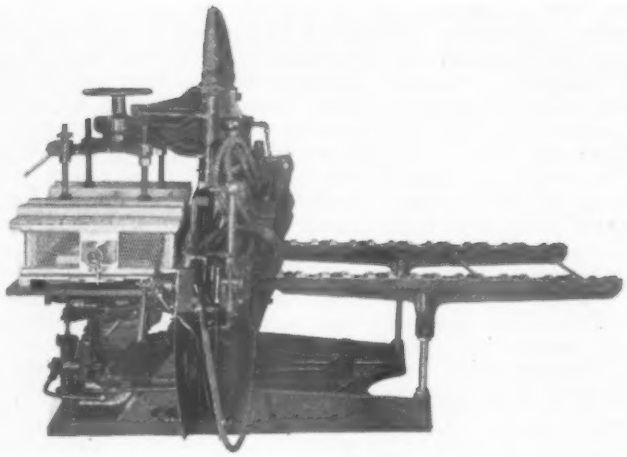
The industry must see the light on this. It cannot continue to work for its customers. It must establish the right price and make it stick. Cut-throat competition must be abolished. The day is coming when competition again will rule and, although that day is not far off, the industry still has time to save itself a lot of grief.

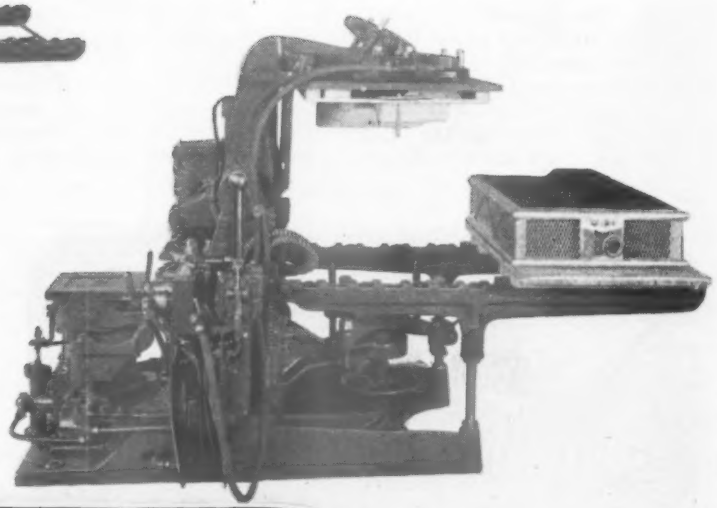
The Gray Iron Founders' Society is developing plans for a comprehensive accounting service available to both members and nonmembers. With your cooperation and support this very necessary job can be done.

Book Review

Transactions of the American Foundrymen's Association; cloth; 1075 pages; published by American Foundrymen's Association, Chicago.

Volume 51 covers the proceedings of the forty-seventh annual meeting held in St. Louis, April 28 to 30, 1943, and follows the general pattern of the long series extending back to the formation of the association in 1896 in Philadelphia. It presents a list of officers and directors, summary of proceedings, condensed technical program, president's annual address; officers' reports, minutes of executive board meetings, the first of a proposed series of Foundation Lectures, and transcript of 73 technical papers and committee reports with discussion. The book concludes with an index based on the subject matter, and a second index showing the list of authors.





Above—View of No. 815 Jolt, Roll-Over Pattern Draw Machine Clamped, Equalized, and ready for Roll-Over Operation.

At Right—View of same Machine after Rolling Over, Showing Perfect Pattern Draw.

A FAST HIGH PRODUCTION JOLT, ROLL-OVER PATTERN DRAW MACHINE FURNISHED IN THREE SIZES

• Johnston-Jennings Jolt Roll-Over Pattern Draw Machines meet every requirement for fast, easy, efficient work. They assure maximum production even with relatively unskilled operators,—and are standard equipment in most large aluminum and magnesium foundries. These machines are built in three sizes and require no pits. They are of open end construction and incorporate many design and operating refinements much appreciated by practical operating men. Our fully descriptive catalog giving complete details of this and other Johnston & Jennings molding machines furnished gladly on request — No obligation — Send for a copy today.

THE JOHNSTON & JENNINGS CO.

867 ADDISON ROAD • CLEVELAND, OHIO

A COMPLETE LINE PROVEN IN SERVICE INCLUDING—

PLAIN AIR JOLTS
in 12 different sizes

JOLT SQUEEZERS
fast sturdy machines—3 sizes

JOLT STRIPPING PLATES
4 sizes ranging up to 16" draw

JOLT, SQUEEZE, STRIPPING PLATE AND PATTERN DRAWS
Popular for medium service —2 sizes

PORTABLE JOLT ROLL-OVER AND PATTERN DRAW
A heavy duty thoroughly dependable machine—portable

JOLT ROLL-OVER AND PATTERN DRAWS
Fast large capacity machines with roll-out conveyors—4 sizes

Write for fully descriptive catalog giving complete specifications.

STEEL FOUNDRY POURING PRACTICE

(*Continued from page 75*)

that in the ladle, and it tends to cool faster. Therefore, the first metal poured from the ladle will be on the cold side, and the same will be true if there are delays between pouring molds or between fillings of shank ladles from the main ladle. However, the tea-pot ladle is in most ways the best equipment for pouring heats up to 3 or 4 tons in weight, and it is used widely in converter and electric furnace shops making small castings of carbon and alloy steels. As mentioned before, some makers of austenitic manganese steel castings prefer the old-fashioned open lip-poured ladle.

In shops using the coreless type induction melting furnace, the usual practice is to pour from shank ladles filled from the furnace and usually provided with the skimming lip already described. However, these furnaces are in reality ladles themselves, rather than furnaces, and can be poured directly into molds without the use of separate ladles. Of course some rapid means of bringing the molds under the spout has to be provided. The method of mounting these furnaces is particularly well suited to direct pouring, as they are arranged to pivot about the spout as a center and pouring is from a constant level. This is not true of lip-pour or tea-pot ladles, which necessarily pivot about a point further down the ladle so that the first metal is poured from a considerably higher level than the last metal out of the ladle.

In addition, as long as the power is kept on a coreless induction furnace, the slag is kept back automatically from the lip. Special metals such as alnico and similar magnet steels, readily chill below proper pouring temperature when an attempt is made to handle them with ladles. Therefore, they often are direct-poured from coreless induction furnaces. As the late Dr. Northrup said to the present author, who first proposed and used this practice, it sometimes pays to bring the peanuts to the elephant, rather than carry the elephant to the peanuts!

Large electric furnace heats and open-hearth steel practically always are poured through a nozzle in the bottom of the ladle. The difficulty of lip pouring large ladles full of metal makes this necessary, and in the case of open-hearth steel it is doubtful if the metal would remain hot enough to pour if it were not protected by a blanket of slag. Certainly this would be true if a number of castings were to be poured from one heat, as for instance in shops making side frames, bolsters and similar railroad work.

Metal Poured Through Nozzle

The nozzle and stopper arrangement in a steel ladle appears clumsy and crude, but to design any radically different device for taking metal from the bottom of a large ladle is next to impossible. This is especially true since tipping the ladle to pour through a tea-pot spout is not practicable. The nozzle is a comparatively simple matter, being merely a suitably shaped refractory piece with a hole of the desired size through it, and provided with a shoulder to fit against the nozzle plate so that the pressure of the steel will not push the nozzle through the bottom of the ladle. Of course, the top of the nozzle is cup-shaped to take the end of the stopper rod. The material used to tamp over the bricks in the bottom of the ladle is rammed tightly between the nozzle and the rest of the lining, forming a shallow basin in the bottom of the ladle, with the nozzle at the lowest point. Usually the nozzle is made of a special grade of fire brick.

The problem of designing a device that permits easy and repeated opening and closing of the nozzle to let the desired amount of metal run out, is a different matter. The fluid pressure in liquid steel is about 3.4 pounds per square inch at a depth of one foot below the surface, and increases in direct proportion to the depth of metal. Therefore, at the bottom of a ladle with a 6-foot depth of metal the pressure is approximately 20.4

(*Continued on page 212*)

NATIONAL METAL CONGRESS and War Conference Display
CLEVELAND PUBLIC HALL
Cleveland, Ohio
October 16th - 20th
Booth and Space No. A-424

Precision

HYDRAULIC TESTING MACHINES

. . . . have repeatedly demonstrated the practical truth in the words, "One Test is Worth a Thousand Expert Opinions." Because they have simplified the science of testing the physical properties of materials they are widely used throughout the wartime industries today. Here Riehle Testing Machines "ferret out" material weaknesses and defects; avoid failures before they occur. This technique of progressive testing on the production line and in research laboratories saves valuable machine and man-hours. Write for descriptive literature and quotations.

Pendulum load indication is more accurate and dependable because it operates on the natural laws of gravitation. This principle of operation is not affected by temperature changes or subject to metal fatigue. .

ARMY E NAVY

RIEHLE HYDRAULIC TESTING MACHINES

Riehle Testing Machine Division, American Machine and Metals, Inc.
EAST MOLINE, ILLINOIS

Other Products: IMPACT TESTERS • VICKERS HARDNESS MACHINES
BRINELL HARDNESS TESTERS • MEASURING INSTRUMENTS

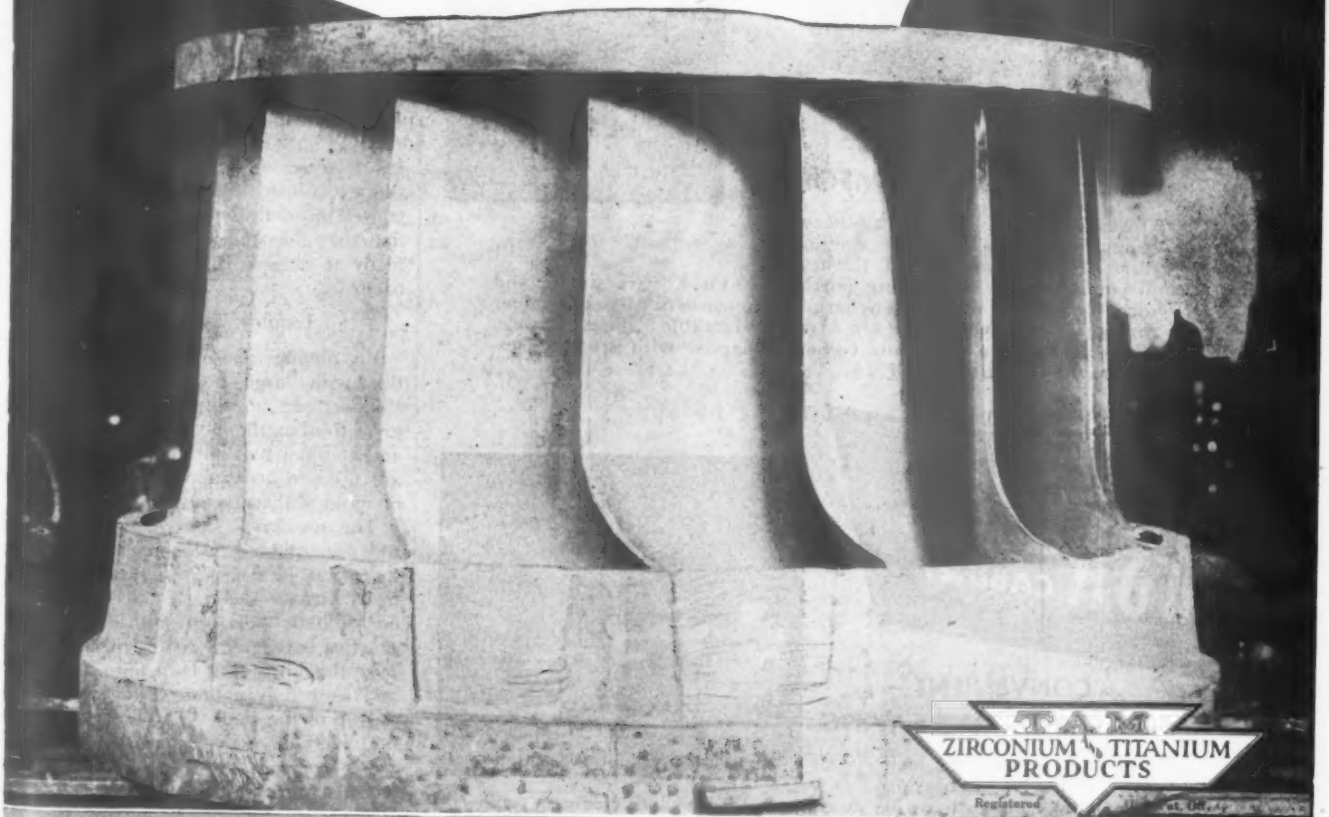
SMOOTH FACES FOR CASTINGS

TAM Zirconite super-refractory mold and core washes produce smoother surfaces and reduce cleaning costs

By resisting the burning-in of the molten metal, TAM Zirconite Mold and Core washes speed up output of good castings by reducing the number and time of cleaning and finishing operations. Available in three grades: Zirconite A has a melting point above 3775° F.; Zirconite B has a melting point above 3600° F.; and Zirconite C, for special uses, has a melting point above 3600° F. They are quickly mixed by adding to water, and can be applied by either spraying, swabbing or painting on cores and molds. Write for complete details, today.

TITANIUM ALLOY MANUFACTURING COMPANY

Zirconite Wash was used on this 94,000 pound .30-.35 carbon steel casting—11'6" high 14' diameter. Of special interest is the fact that no nails were used in the facing.



TAM ZIRCONIUM TITANIUM PRODUCTS
Registered

GENERAL OFFICES AND WORKS: NIAGARA FALLS, N. Y., U. S. A.
EXECUTIVE OFFICES: 111 BROADWAY, NEW YORK CITY

Representatives for the Pacific Coast . . . BALFOUR, GUTHRIE & CO., San Francisco, Los Angeles, Portland, Seattle, Tacoma
Representatives for State of Michigan . . . . . NATIONAL FOUNDRY SAND CO., 2770 West Grand Blvd., Detroit
Representatives for Canada . RAILWAY & POWER ENG. CORP., Ltd., Toronto, Montreal, Hamilton, Winnipeg, Vancouver, Sydney
Representatives for Europe . . . . . T. ROWLANDS & CO., Ltd., 23-27 Broomhall St., Sheffield, England

(*Continued from page* 210)

pounds per square inch. With a 3-inch nozzle, whose area is about 7.07 square inches, the total pressure is roughly 144 pounds. This would make it extremely awkward to attempt to open and close the nozzle opening by means of any stopper mechanism which would be inserted from the outside, like a cork in a bottle. In addition such a stopper could not be moved out of the way fast enough to give a quick, clean opening. Therefore, the only practicable method is to use a stopper on the end of a long rod, extending down through the steel, and closing the nozzle opening from the inside. The rod must be stiff enough to stay straight and must be protected by heavy brick tile slipped over the rod and joined by a male and female joint. The stopper itself is composed of graphite and clay in approximately equal parts It may be provided with a threaded hole in its center, and screwed to the end of the stopper rod. However this type tends to break from the expansion of the rod as it heats up, and generally is not favored, except for small heats. The more common type has a shouldered hole through it and is held to the stopper rod by means of a bolt that passes through the stopper and into a hole in the end of the rod. It is tightened by means of a tapered key driven through a slot in rod and bolt. The hole in the end of the stopper over the bolt then is plugged with refractory material, and the sleeve brick are slipped over the rod one after the other, the joints being smeared with a stiff clay slurry. A washer is placed over the top sleeve, and the whole assembly is tightened by means of a nut running on a thread at the top of the rod, and bearing on the washer. The assembled stopper then is dried by placing it near the furnace, or preferably in a suitably heated oven of simple construction.

When the heat is nearly ready to tap, the stopper rods are set in place and adjusted to seat properly in the nozzles. A sliding mechanism on the outside of the ladle carries a horizontal member called a *goose-neck*, with a forked end into which the top of the stopper rod is slipped. The nut holding the sleeve brick in place is loosened enough to allow for the expansion of the sleeve brick. This prevents their crushing each other and cracking as they swell up from the heat of the surrounding steel. The stopper then is attached tightly to the goose-neck by means of two nuts and washers, one above and one below the goose-neck. The slide, goose-neck and rod must be adjusted so that the stopper head moves in a truly vertical direction when it is lifted off the nozzle. Operators generally set the stopper so that when the ladle is empty the stopper head comes down on the outer edge of the nozzle rather than truly central. When the steel is being poured, the rod tends to shift inward so that the stopper seats itself centrally on the nozzle. The stoppers are lowered when finally adjusted, the slides clamped tight, and fine sand is poured around the stoppers to be sure that they do not leak. The ladle then is ready to receive the steel from the furnace.

Employ Two Stoppers

For obvious reasons it is common practice with large heats to provide two stoppers and nozzles. If the first nozzle gives trouble, the second one can be used; and at times two different sizes of nozzle are used to accommodate different sizes of mold with a single ladle.

The fire brick sleeves of the stopper rod are attacked more readily by basic than by acid slags, consequently in large heats heavier sleeves usually are provided for basic steel. In addition, common practice is to spill a good deal of the slag over the lip of the ladle into a slag pot and keep only a limited amount of slag on top of the steel. This is more important with large heats of basic steel than when pouring acid steel. Another precaution often taken is to use heavier sleeves at the lower end of the rod which has to resist the metal longer, than at the upper portions.

When the first metal is poured from the ladle, it is desirable to run enough out to heat the nozzle so that the stopper can seat itself tightly when it is lowered to shut off the stream. Therefore, it is good practice to open up over a good

(*Continued on page* 214)

M·S·A EYE PROTECTION

. . . . . for the MODERN Foundry Worker

MINE SAFETY APPLIANCES CO.

LOOKS

ALL PLASTIC GOGGLES

LIGHT WEIGHT—
WIDE VISION—COMFORT

These new lightweight all-plastic goggles afford wide vision and comfortable eye protection for the foundryman against light flying particles. LOOKS are strong and durable, yet low in cost. The large "aviation-type" lenses of clear or green polished acetate are easily replaceable. Three models: General Purpose, Dust, and General Purpose with green lenses. Write for Bulletin No. CE-25.

M·S·A GOGGLE CLEANING CABINET

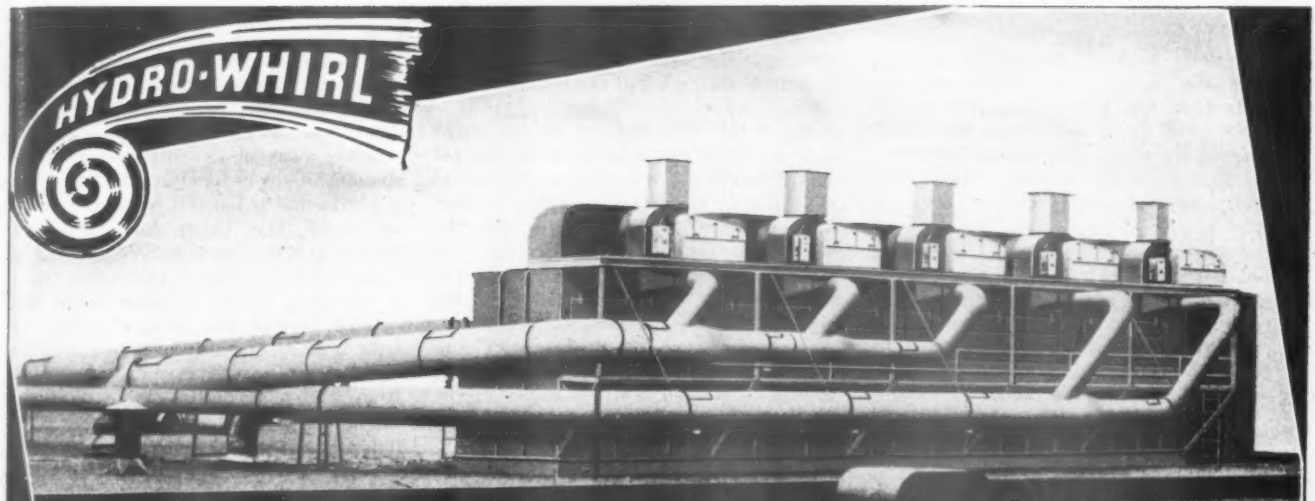
CONVENIENT—
COMPACT—TIME SAVING

The M. S. A. Goggle Cleaning Cabinet encourages the foundry worker to wear his goggles and keep them clean. A tap on the button sprays Fogpruf—an efficient cleaning and anti-fogging agent—on the goggle lenses. Convenient Optical Wiping Tissues and waste receptacle are provided. Designed for wall mounting. Bulletin No. CE-24.

MINE SAFETY APPLIANCES COMPANY

BRADDOCK, THOMAS and MEADE STS., PITTSBURGH, PA.

District Representatives in Principal Cities



Answer YOUR DUST-CONTROL PROBLEM with Hydro Whirl

We invite you to call in our engineers to discuss your plans whether you contemplate a new plant or expect to reconvert your present one. We shall be glad to help you either in an advisory capacity or to help lay out a complete processing system.

Hydro-Whirl Dust Collectors are engineered to meet any requirements—from 700 to 100,000 C.F.M.—designed for all forms of dust —— (magnesium, aluminum, iron) created from grinding, buffing, polishing, or sanding. The dust is "water-whirled" out of the air and is knocked down into a tank below, from which it is removed periodically as sludge by conveyor.

HYDRO-WHIRL

PETERS-DALTON *Incorporated*

625 EAST FOREST AVE. • DETROIT 1, MICH.

(Formerly Industrial Sheet Metal Works)

MFRS. HYDRO-WHIRL DUST COLLECTORS AND SPRAY BOOTHS—INDUSTRIAL OVENS, MECHANICAL WASHERS AND VENTILATING SYSTEMS

(*Continued from page* 212)

sized casting. When there is considerable delay between the pouring of castings—for instance, in transferring the ladle from one part of the shop to another—it is desirable to open the nozzle every little while and run a little steel out to prevent the stopper from sticking so tightly that it may pull off the rod. In case the stopper does get stuck, it should be opened by means of a pricker rod poked through the nozzle from the outside. A frozen stopper, due to cold metal or delay in pouring, can be opened by means of an iron pipe connected by rubber hose to a cylinder of oxygen. The end of the pipe is heated, the oxygen turned on to start the pipe burning, and the burning end is poked into the nozzle opening. The steel in the nozzle is quickly burned through and the stream started again.

For a full discussion of the causes of and the latest means adopted to prevent leaky stoppers, the reader is referred to an article by Clyde Jenni (THE FOUNDRY for September). Mr. Jenni describes the method he originated for detecting defective stopper heads by means of x-ray examination. He also discusses the difficulties that are encountered when nozzles are made of too hard a brick. In that case it is difficult if not impossible to seat the stopper properly in the nozzle and a leaky or dribbling nozzle is the result.

A leaky nozzle may be due to this cause, to improper setting of the stopper rod so that the stopper does not come down true in the nozzle, to erosion or wearing away of too soft a nozzle, or to spalling of the stopper head. Sometimes a nozzle that is too soft, instead of wearing away, may mash down when the stopper is seated on it, and close itself off.

A cold heat of steel, also, often makes a dribbling nozzle, because some steel freezes around the stopper when the ladle is filled, and this layer of steel sticking to the nozzle prevents the stopper from seating properly. As more steel is run out of the ladle, this skull as a rule melts away, so that the leak stops.

The ladle men usually can control a dribbling nozzle by working the stopper up and down repeatedly as a mold is being filled, and two or three of them on the handle usually can force the stopper down tight enough to at least partially shut off the flow of steel. When this fails, the nozzle may be frozen off by lowering the ladle into a heap of moist sand and keeping it there until the steel freezes in a mass over the nozzle plate. The second nozzle can then be opened up and used to pour the rest of the heat. Only when the stopper head breaks up badly or pulls off the rod, or the rod burns off, should it be necessary to abandon the effort to save the heat, and run the steel into a pig bed, the open-hearth ladle pit, or some other available place.

Select Nozzle Size

Nozzle openings should be selected to give the right size streams for the castings being poured. Light jobs like freight car side frames and bolsters, for instance, are best handled with a 2½-inch or 3-inch nozzle, while very large castings may require a 4-inch nozzle or even one a little larger. Electric furnace steel, which is usually made in much smaller heats than open-hearth metal, and is on the average considerably hotter, can be poured with a 1½-inch or 2-inch nozzle.

In filling molds with bottom pour ladles, it is the best practice to run in the first metal not too fast in order to avoid cutting the sand and moving internal chills, then speed up the pouring until the metal reaches the cope, then again pour more slowly. As a rule, the last metal is poured directly into the sink heads instead of down the gate, so as to put the hottest steel in the heads where it will remain hot longer, and so secure better feeding. Control of the pouring rate is accomplished by lifting the stopper to a partial or a full opening as desired. However, to try to pour only a very small stream defeats its own purpose, as the metal than runs from the nozzle in a stream that fans out as it comes, and splashes over the top of the pouring cup. However, a fair measure of control usually is attained.

Design of ladles is more important in bottom pouring through a nozzle than in lip pouring, because the depth of steel in

(*Concluded on page* 216)

ALUMINUM IS VITAL

salvage it as Primary Metal!

DEMPSEY FURNACE

DEMPSEY *Chip and Dross* MELTERS

DEMPSEY FURNACES
PRODUCING
FOR INDUSTRY

Bethlehem Steel
Bohn Aluminum & Brass
Buick Motors
Caterpillar Tractor
Ford Motor Co.
General Electric
Nash-Kelvinator
Oldsmobile
Reynolds Metals
Sperry Gyroscope
Worthington Pump and Machinery
Wright Aeronautical

Precious aluminum, life blood of the airplane industry must be reclaimed in as pure a form as possible if the essential implements of war are to be produced on schedule. That is why so many DEMPSEY furnaces are being used for converting aluminum chips and dross into primary metal with a recovery rate of 85% to 95%.

Oil, gas or coke fired, they provide faster melting time, simple single-valve control, easy control of tapping speed and may be equipped with mechanical puddlers which reduce oxidization loss to a minimum.

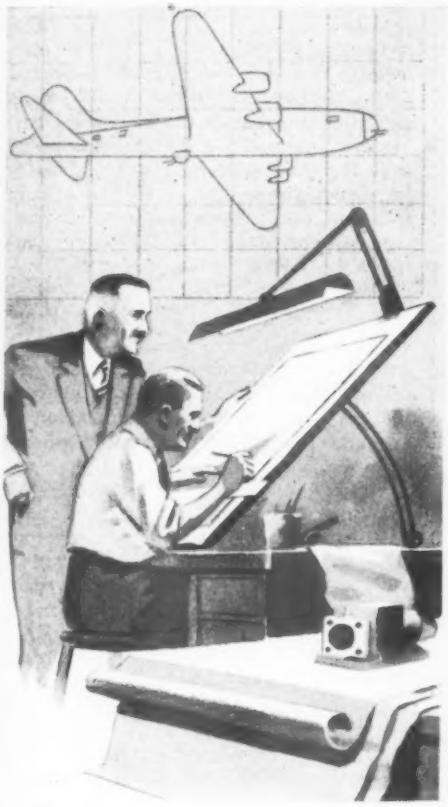
Speed of installation is assured by a wide variety of types and sizes, the plans and patterns for which are now ready.

Send for literature or qualified representative

DEMPSEY INDUSTRIAL FURNACE CORPORATION
SPRINGFIELD • MASSACHUSETTS

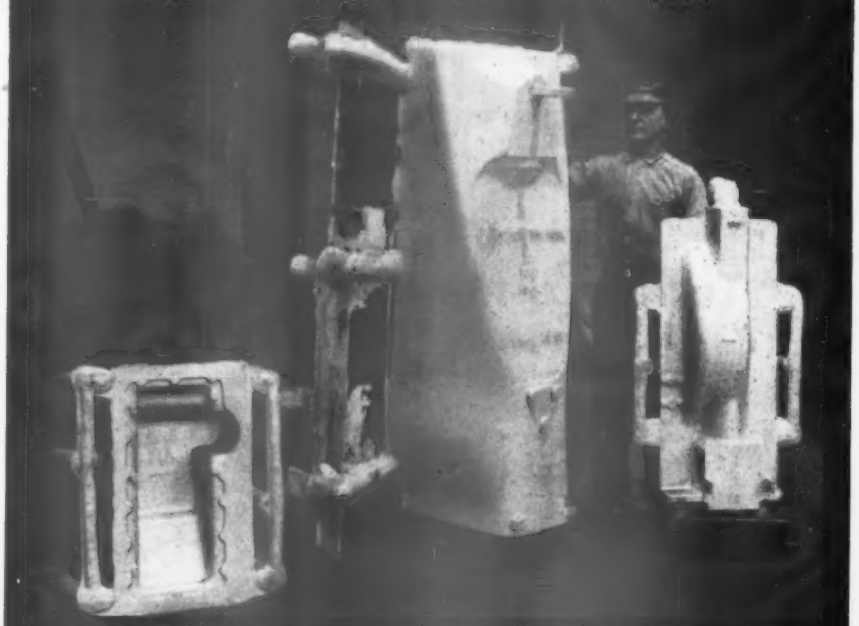
AT THE METALS SHOW . . . BOOTH E613

There are
no restrictions on
conservative planning
for peace
TODAY
OR TOMORROW



BUY
MORE
BONDS
★
KEEP
WHAT YOU
BUY

SECTION OF METAL PATTERN DEPARTMENT



ALUM. COREBOX ALUM. PATTERN CASTINGS

CITY PATTERN
FOUNDRY AND MACHINE CO.
1161 HARPER AVE. at RIVARD ST., DETROIT 11, MICH.

WOOD AND METAL PATTERNS
KELLER AND DUPLICATOR WORK
MACHINE WORK · MALLORY
METALS · BERYLLIUM COPPER
MONEL METAL · EVERDUR CASTINGS
COPPER CASTINGS OF HIGHEST ELEC-
TRICAL CONDUCTIVITY · BRASS, BRONZE
AND ALUMINUM CASTINGS

Established
1913

(*Concluded from page 214*)

the ladle has a great effect on the velocity of the stream flowing from the nozzle. A ladle that is very deep for its width gives great pressure at the nozzle when the ladle is full, so that the velocity of the stream is very high. Naturally, the last metal poured runs much slower. Only when very large castings are to be poured, especially castings where the steel must run a great way through horizontal gates, is such high pouring velocity advantageous. For most work, a wide ladle as shallow as the desired capacity allows is to be preferred. With such a ladle, there is the minimum amount of difference in stream velocity as pouring proceeds, so that a number of castings may be poured with not too great a variation in pouring rate.

Also, with very deep ladles it is much more difficult to set the stopper rods properly so that a clean, easy shut-off is secured. The longer the rod, the greater the effect at the stopper end of a small difference in the angle at which the rod is set. A very long rod, of course, is also open to the objection that it is more "limber" than a short one, especially as it heats up, and therefore it tends to shift its position more as pouring proceeds. Consequently, it is more difficult to set a long rod than a short one so that it will seat correctly in the nozzle.

Now—Air Operated Collet Chuck Relieves Second Operation Work on Screw Machines

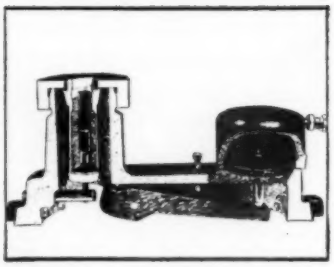
Work formerly requiring automatic or hand screw machines can now be done at much less cost through the combination of this new air chuck and any drill press. The Redmer Air Chuck is a collet air chuck using standard Brown & Sharpe type screw machine collets. The collet remains stationary, the opening and closing controlled by a sleeve action.

By using a collet as the chucking means, slight variations in the diameter of the work as frequently experienced with automatic and hand screw machine products can be permitted without sacrificing accuracy or concentricity. Thus accomplishing an important saving in time and cost.

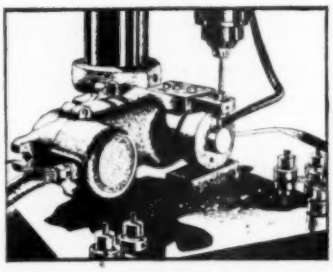
The air chuck is an ideal tool for holding parts for drilling, milling, slotting, burring, chamfering, boring, counterboring, tapping, threading, reaming and other work where the machine operation should be concentric with the chucking surface. It is adaptable to many different jobs merely by changing collet and stop. This results in saving of valuable production metals and materials. The chuck will take any type work whether round, hex, square or rectangular, and permits full efficiency of the operator, as it is operated by a foot operated valve thus leaving hands free to load and unload—reducing fatigue and cutting unproductive time to a minimum.

Wrigley's Spearmint Gum, too, is a help on the job. For chewing gum helps relieve dry throat, and helps ease fatigue brought on by the strain of work. And at the same time you are chewing and getting the benefits of swell tasting Wrigley's Spearmint, both hands are free and you need not take a "time out." The Army and Navy have recognized these benefits and are now shipping overseas *only,* all of the limited production of Wrigley's Spearmint. When Wrigley's Spearmint can again be produced in sufficient quantity for all, the valuable benefits of Wrigley's Spearmint Gum now being proven on the battlefield will apply to industry here at home.

You can get complete information from Redmer Air Devices Corp., 601 West Washington Blvd., Chicago 6, Ill.



An air operated collet holding fixture for precision chucking or machine tools



Chuck can be mounted on angle for angle milling job

Y-151

HOW TO MELT BRONZE FOR CASTINGS

(*Continued from page 83*)

cible.

The tilting type crucible furnace adopted extensively in recent years, is operated on the same principle as the ordinary stationary pit type, except that instead of withdrawing the crucible at the end of each melt, the furnace is tilted by a geared mechanism and the molten metal is spilled into a preheated pouring ladle. The main advantages of this type furnace include: Much greater life of the crucible since it is not subjected to shocks of heating and cooling; and by conservation of heat in the furnace for repeated melting.

Troubles with crucible and electric melting of bronzes mainly are associated with oxidation or burning of the metals and gas absorption. Oxidation or burning of the metal is a common complaint from the molding shop foreman and molders, but under modern conditions usually it is a mistaken conclusion on their part, especially when gas inclusions in the casting is the subject for discussion.

Excess Air Is Dangerous

Free oxygen in amounts to cause trouble usually is not encountered in gas, oil and electric melting. Excess air over that required for efficient combustion of the oil or gas readily is noticeable, whereas excess air in coke fired melting is not detected nearly so readily and merely results in reducing the efficiency and speed of melting, while bringing dangerous quantities of air (oxygen) into contact with the metal. Even with efficient coke-fired melting a much greater excess of air must be used than for gas and oil, owing to the coke being much less readily inflammable. This is the reason that ample covering of the metal with charcoal may be desirable in coke-fired melting, whereas for oil and gas fired melting it is not essential and, in fact, in most cases is detrimental. This distinction rarely is pointed out in discussions on melting.

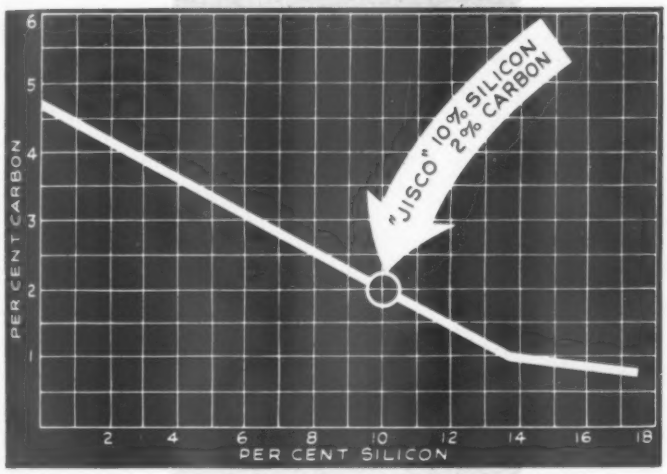
Oxygen rarely is present dissolved in alloys. It forms a chemical combination with the metal in the alloy for which it has the greatest affinity. Resulting oxides, when formed, appear as slaggy, nonmetallic inclusions, sometimes large or sometimes mere films between the grains of the alloy, thus reducing the strength. In addition, these oxides reduce the fluidity, make the alloy sluggish and of poor casting quality.

Where possible, of course, it is preferable to prevent oxidation during melting by correct melting conditions, but where somewhat oxidized metals are used in the charge or oxidation has taken place during melting, the usual practice is to treat the metal with a deoxidizer just before pouring.

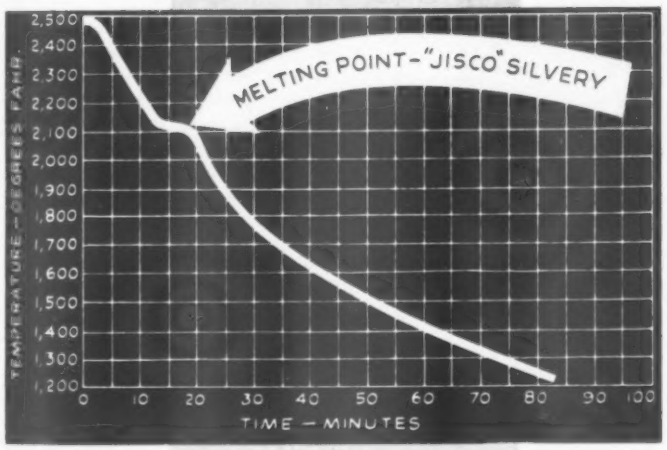
(*Continued on page 218*)

Jisco IS TOPS . .

FOR DUPLEX MALLEABLE



CARBON IN PIG IRON No. 1



COOLING CURVE 10% SILICON IRON No. 2

HIGH SILICON IRON "JISCO"

That's the story . . . Orders prove it

A Most Exacting Field
If it isn't Right, it isn't Malleable

JISCO SILVERY IRON

Pig Iron plus Silicon from Virgin Ores

A perfect combination for the most exacting in any ferrous field

A quality long demanded by AGGRESSIVE GRAY IRON FOUNDRYMEN

• • • • •

Jisco Silvery Iron has a low carbon content (see graph No. 1) and has a melting point (see graph No. 2) in the range of other melting stock. This combination fosters Uniform Iron of Low Carbon Content from the cupola.

THE JACKSON IRON & STEEL *Company*
JACKSON, OHIO.

(*Continued from page* 216)

A deoxidizer is a compound containing an element or elements having a greater affinity for oxygen than the oxidized metals in the bronze and which will combine readily with the oxygen of the oxides formed in the alloy, leaving the metal as such. An important requirement for a deoxidizer is that, in combining, the element of the deoxidizer must form an oxide which easily separates from the alloy by being fluid or light enough to float off in a surface slag.

The most important and widely used deoxidizer for bronzes is phosphorus. This substance is too dangerous to use in the natural state, or as straight phosphorus. Generally it is employed in the form of phosphor-copper containing 15 per cent phosphorus, remainder copper. Usually about one quarter of 1 per cent (0.25) is added to gun metal, 85-5-5-5 and other tin bronzes just before pouring to deoxidize and fluidize the bronze. Other powerful deoxidizers include aluminum, magnesium, calcium, silicon, manganese, but they each have disadvantages and are not used for deoxidizing bronze.

Hydrogen and carbon monoxide gases are responsible for most gassing of bronze during melting. Hydrogen is formed by the dissociation of water in the combustion products of the fuel and of moisture introduced into the furnace by wet metals, coke or charcoal. This dissociation of water into hydrogen and oxygen is very active in the presence of incandescent charcoal and carbon monoxide.

Recently it has been demonstrated that hydrogen is soluble only in molten bronze and that carbon monoxide is not soluble and therefore does not contribute to passing the metal except indirectly by aiding dissociation of water vapor.

Ladles or crucibles used externally to receive the melted alloy from tilting furnaces should be raised to red heat before pouring metal into them. Much gas trouble can be caused by the use of green ladles.

Hydrogen does not react (as does oxygen) to form a combination with metals in the charge, but merely dissolves in the alloy. Furthermore, the higher the temperature the metal is raised above the melting point, the greater is the dissolving power of the metal for this gas.

Effect would not be so serious if the hydrogen gas was released gradually as the alloy cooled, so that the greater part could escape through liquid metal. This does not take place. The alloy retains practically all the dissolved gas until just above the freezing point when it is released suddenly. At this stage the alloy is not fluid and mobile. The gas bubbles remain distributed through the various sections with resulting porosity of the whole casting.

Diagnose Cause of Gas Holes

Understanding of this characteristic of dissolved gas in alloys is very helpful in diagnosing the cause of gas holes which appear in castings. Where metal is spoiled by gassing during melting, the entire quantity of metal melted contains dissolved gas in uniform distribution. When that metal freezes in a mold, the gas is liberated from metal in all sections of the mold. Therefore, there will be gas holes in all parts of the casting. Also, all castings poured from that particular heat of alloy will have gas porosity. Frequently gassing of metal during melting is suspected when these conditions are not fulfilled. Where gas porosity is localized and the greater part of the casting is sound, or when a few large, widely separated holes appear, or when some castings poured from a ladle are sound, while only a proportion of castings poured others from the same ladle are gassy, evidently some other cause is responsible for the trouble.

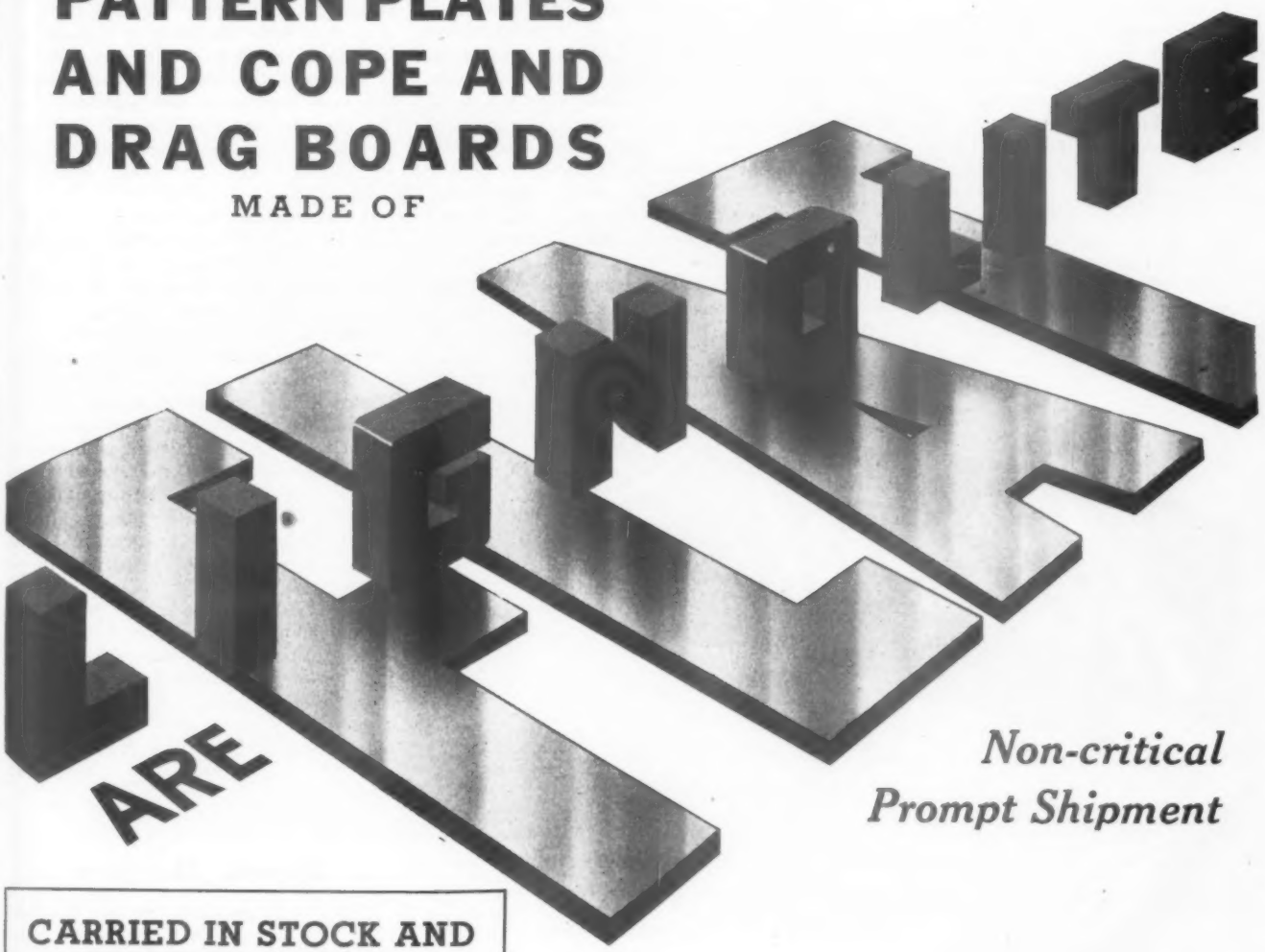
Causes of gas holes in castings, apart from faulty melting include: Trapping of air in the gate during pouring especially when the mold is poured too cold. Mold or cores generate gas which may be absorbed or trapped by the liquid metal instead of escaping through risers or vents. Wet sand generates steam that cannot be expelled adequately by vents. Metal kicking against cold or damp chills, especially large chills, can form blowholes. These may remain at or near the chill, indicating the cause, or may be carried further into the casting section by the pressure of the flow of metal, where

(*Concluded on page* 220)

For
Sound Castings
SMOOTH and CLEAN
CAPEWELL CHILL NAILS
They are cold rolled from the finest soft iron. The Capewell line is the most complete — with nails for every purpose and every size of casting. Samples and prices promptly sent on request.
THE CAPEWELL MFG. COMPANY
Hartford, 2, Conn.
TECHNITE
CAPEWELL
HACK SAW BLADES
Cut Costs and Cut Time
The Capewell method of heat treating provides you hack saw blades that cut faster and last longer. Test them yourself, on your toughest job. Order from your mill supply man.
CAPEWELL
CHILL NAILS • HACK SAW BLADES

PATTERN PLATES AND COPE AND DRAG BOARDS

MADE OF



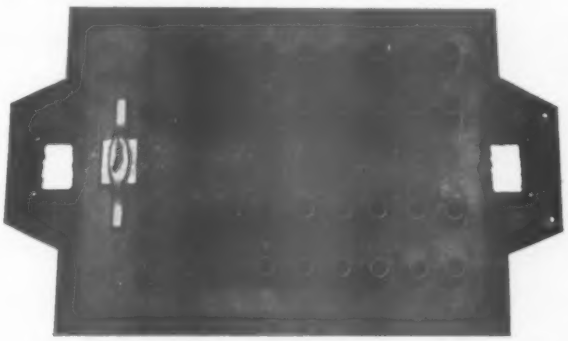
Non-critical
Prompt Shipment

CARRIED IN STOCK AND DISTRIBUTED BY

ADAMS & NELSON COMPANY
4125 Fullerton Avenue, Chicago, Illinois
BARADA & PAGE, INC.
2812 Center Street, Houston, Texas
M. A. BELL COMPANY
217 Lombard Street, St. Louis, Missouri
COMBINED SUPPLY & EQUIPMENT CO., INC.
215 Chandler Street, Buffalo, N. Y.
FREEMAN SUPPLY CO.
1152 E. Broadway, Toledo, Ohio
E. R. FROST COMPANY, INC.
1406 Quincy Street, Minneapolis, Minn.
GRANT & COMPANY
2144 E. 7th Street, Los Angeles, California
GEORGE F. PETTINOS, INC.
1206 Locust Street, Philadelphia, Pa.
WATERSTON'S
28 East Larned Street, Detroit, Michigan
WESTERN FOUNDRY SAND CO.
1039 Elliott Avenue West, Seattle, Wash.

In Canada:
GEORGE F. PETTINOS, (CANADA) LTD.
42 James Street South, Hamilton, Ont.

• They stay flat because LIGNOLITE has high transverse strength and resistance to deflection. It is impervious to moisture and does not warp from contact with wet sand or high humidity. LIGNOLITE is half the weight of aluminum, is abrasion proof, of uniform caliper, and may be easily machined, sawed, drilled, tapped. Available in all flask sizes 7/16″ to 2″ thick or in sheets for own cutting. Write for sample and complete information.



Mounted LIGNOLITE Pattern Plate

MARATHON CORPORATION

CHEMICAL DIVISION — **ROTHSCHILD, WISCONSIN**

(*Concluded from page* 218)

the cause of the hole or holes would not be so obvious.

It is much more difficult to determine which of these causes is responsible than to decide whether they or the metal produced the gas. A correct judgment of these other causes depends on experience and close observation of details, together with a thorough understanding of gating and pouring practice.

Considerable difference of opinion exists on the value of materials classified under the general term fluxes. Some of these compounds are definitely helpful in some cases and impotent in others. Recommendations of the makers of the various compounds may be followed and results observed.

The various compounds in general may be classified as follows: A deoxidizer is a compound or metal which will break up metallic oxides and combine with the oxygen previously combined with a metal in the alloy being melted. The oxide so formed must readily separate from the alloy by gravity, or, if it does not, the deoxidizer must contain also some material having a fluxing or liquifying characteristic to assist in separating the dross from the alloy.

A degasifier is a compound which will form a considerable volume of gas insoluble in the alloy. The violent bubbling of this gas through the metal helps mechanically to carry with it the dissolved gas, hydrogen. Gaseous chlorine is used in some foundries as a degasifier for aluminum alloys and is very efficient in removing dissolved hydrogen, though it is very unpleasant and poisonous. In this case the reaction is mechanical and chemical. Chlorine unites with the absorbed hydrogen to form hydrogen chloride.

A flux is a compound having a considerably lower melting point than the alloy it is employed to purify. In the liquid state it must have the power to dissolve oxide or other surface matter in the charge. It may not necessarily be a deoxidizer or degasifier, though a combination of materials sometimes may be embodied in one compound, having fluxing, deoxidizing and degasifying properties.

A cover is a material that will form a skin or envelope over the melted alloy, largely preventing the absorption of gases by the metal in the furnace atmosphere. It may or may not have either fluxing, deoxidizing, or degasifying properties.

A widely used cover for brass and bronze melting is common bottle glass which in itself is of lower melting point than the metal and forms a neutral liquid cover over molten metal. Some fluxing properties are given to the glass by mixing with it about 10 per cent of borax which is a good solvent for metallic oxides.

Action!
For more than 50 years ACTION has been our watchword. Yes, *productive action!* Here an organization of specialists is always ready to serve you . . . Men whose long years of experience are particularly valuable to our customers these war days.
*Our nine offices, staffed by these highly trained men, can aid you in securing the ferro-alloys, pig iron, coal, coke, shot and grit best adapted to your particular use.
Call, wire or write—we'll be there!
H W
Hickman, Williams & Co.
(INCORPORATED)
CHICAGO · DETROIT · CINCINNATI · ST. LOUIS · NEW YORK
CLEVELAND · PHILADELPHIA · PITTSBURGH · INDIANAPOLIS

Book Review

Wage Incentives, by J. K. Louden, cloth, 174 pages, 5¼ x 8⅛ inches, published by John Wiley & Sons Inc., New York. Price $2.50.

This book is written for the man of management and the man of labor to tell as briefly and concisely as possible what incentives are and what they can do so that the proper bases and concepts of incentives may be understood. Policies, relationships, controls, etc., are emphasized rather than a review of the many ramifications of various incentive plans.

The book is divided into twelve chapters of which the first is a brief history of wage incentives. The next three discuss relationship of wage incentives to other phases and functions of management, five fundamental types of wage incentive plans, and eleven basic requirements of a sound incentive plan. Other chapters relate to comparison of incentive plans, policies governing wage incentive payments to insure their fair and equitable administration; wage administration; cost control reports; supervisory or keyman incentives; control of quality in incentive installations; and typical incentive installations and union participation.

Foundry equipment orders placed in July represented 375.8 per cent of the 1937-1939 monthly average, according to the Foundry Equipment Manufacturers Association. This compares with 466.1 in June and 379.4 a year ago.

LIGHT METALS REQUIRE *exact* HEAT TREATING

THE LINDBERG CYCLONE FURNACE is used by all the leading aircraft manufacturers and subcontractors in the country. This is because specifications for the heat treatment of magnesium and aluminum alloys are more exacting than for any other furnace application. Properly treated light metal castings can be produced only through temperature uniformity and precise temperature control. The Lindberg Cyclone provides complete assurance of meeting both these requirements.

The principle of fan-driven air from an isolated heat source, pioneered and developed by Lindberg, guarantees temperature uniformity throughout the heating chamber. The tremendous volume of heated air forced through the work chamber at high speed heats all parts of the charge evenly.

And Lindberg's simple but positive "stepless" input control allows temperature regulation to within 2½ degrees. This established temperature is maintained for the long soaking periods required for light metals . . . without fear of over-shooting.

The Lindberg Cyclone is made in the vertical or pit type, box type and rectangular vertical type into which salt pots may be lowered for salt treatment of stampings. Also, other types are available to meet specific needs.

Write for bulletin No. 140.

LINDBERG ENGINEERING COMPANY
2453 WEST HUBBARD STREET, CHICAGO 12, ILLINOIS

Lindberg FURNACES

SUPER-CYCLONE for hardening, normalizing, annealing, tempering

CYCLONE for accurate, low-cost tempering and nitriding

HYDRYZING for scale-free and decarb-free hardening

CONVERT GARAGE INTO A FOUNDRY

(*Concluded from page* 93)

The castings are shaken out almost immediately after they are poured and the sand is cut over for reuse. Small, light castings poured at a temperature of approximately 1300 degrees Fahr. do not heat the sand to any appreciable extent. Following a light sprinkling with water and a toss up with the shovel, the sand is ready for the molder's use immediately.

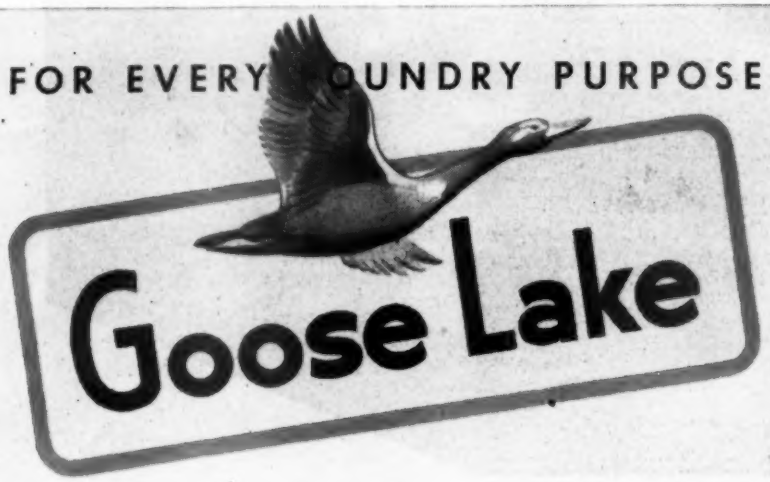
Miscellaneous castings in wide variety of shape and weight are molded by hand on the greater part of the center or main floor. This space is spanned by two light traveling cranes, each equipped with a chain hoist for handling pots of metal, large castings and molds that are too large or awkward to be manipulated by hand. A typical job of this kind is shown in Fig. 4. Equipment includes a follow board, a substantially built cope and drag and an aluminum pattern in two parts, the main part of the pattern, and the rib extension which forms the four square pockets on the cope side. Sides of the cope and drag flask parts are cut to conform to the contour of the casting and thus facilitate making the mold. Steel bolts in the ends and two other bolts extending from side to side of the drag near the center and about 3 inches below the casting, assure rigidity of the flask during the making of the mold, and later when the mold is filled with metal.

Ramming sand in the drag involves a nice degree of skill on the part of the operator. It must be rammed fairly hard at both ends and along the edges to prevent the casting from straining and developing unsightly swelled areas. The sand must be rammed to a lesser degree of density in the mound which forms the concave face of the casting in the drag. After the drag is rolled over, the joint is slicked and covered with a thin layer of parting compound. The upper, or loose part of the pattern is set in place and the cope is rammed, lifted off and rolled over. While in this position the molder extracts the loose part of the pattern. By lifting the pattern with the cope the sand remains intact on the inside and outside of the ribs. It is not disturbed or broken as it possibly might be if the cope *wabbled*, or lifted unevenly from a solid, one-piece pattern. The cope is lifted by attaching the hooks of a crane chain to the trunnions at the ends of the flask. Metal from two crucibles enters the mold at opposite ends, flows gently up the slope and eventually fills the riser on the highest flange.

The cleaning room, equipped with all the necessary appliances, occupies space on one side of the building between the core room and the shipping room near the main entrance. The abrasive blasting cabinet and the various grinding wheel units are connected to an exhaust system which removes and collects dust, sparks, worn grit from the wheels and small metal particles.

An ingenious device for manipulating a large casting in front of a grinding wheel is shown in Fig. 5. A length of 1½-inch rope is reeved through two small sheaves attached to an overhead beam. One end of the rope is tied to a counterweight, in this instance a discarded lump of concrete, while the other end terminates in a small steel hook. The hook engages a short rope sling which may be adjusted to lift and hold the casting in any desired position by the operator.

FOR EVERY FOUNDRY PURPOSE



FIRE CLAYS

• The most widely used of all fire clays in midwest foundries. They supply every bond and refractory requirement. These clays are prepared in a large, modern grinding plant, which for 32 years has served the foundry industry with prompt and dependable shipments.

Valuable consultation is available with experienced engineers for the best use of fire clays in foundry bond and refractory service. They often supply important help for the reduction of foundry scrap losses.

A new booklet with many pictures about the production of Goose Lake Fire Clays is available upon request. Write now for your copy.

Make "your" next car of fire clay GOOSE LAKE

Illinois Clay Products Company

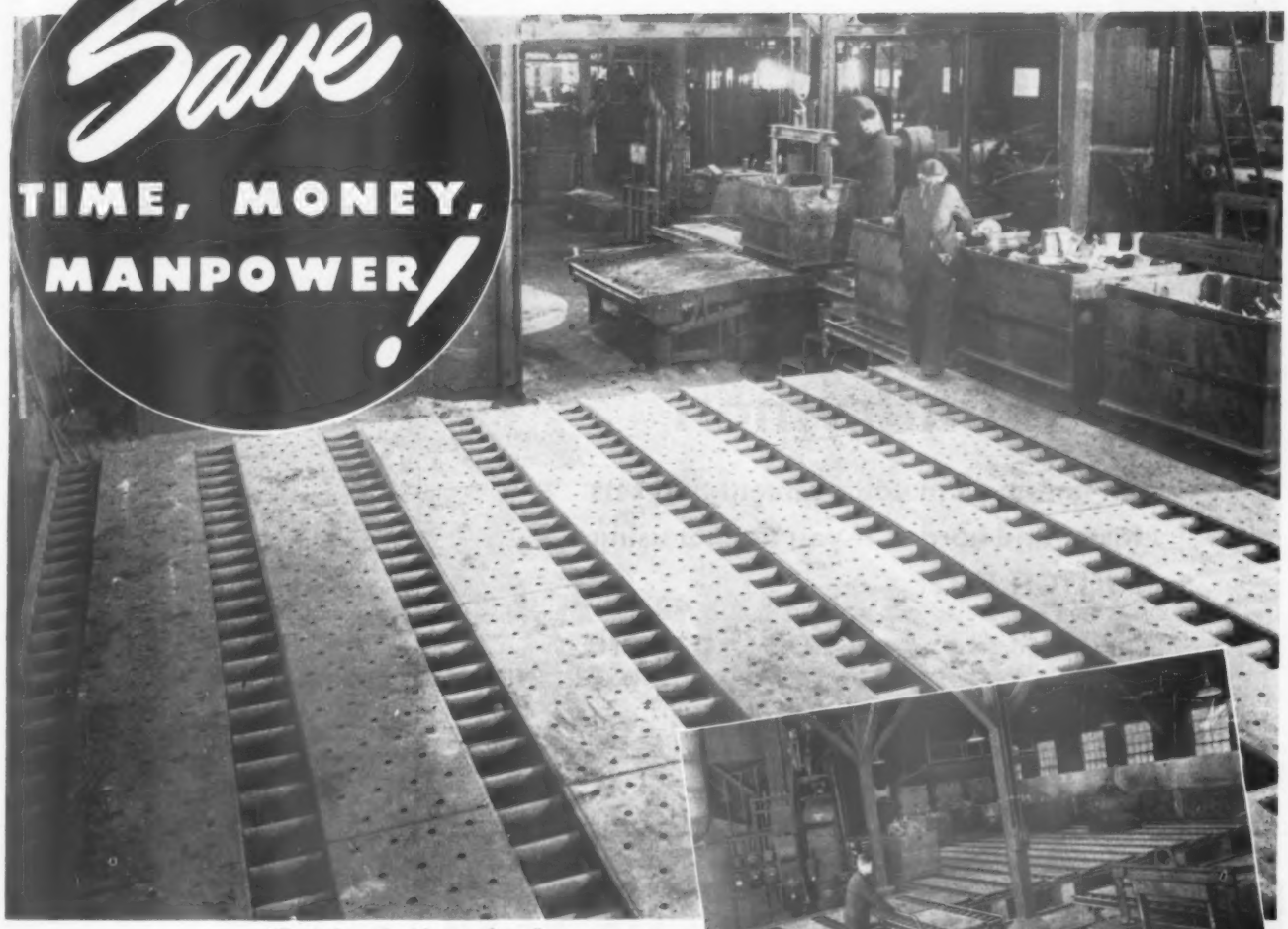
FIRE CLAY · CLAY BOND · BRICK · BLOCK

JOLIET, ILLINOIS

Opens Additional Sales Offices

National Carbon Co., New York, has opened new divisional sales offices in Chicago, Pittsburgh and New York. Similar offices were established a few months ago at Atlanta, Dallas, Kansas City and San Francisco. F. W. Berdan is in charge of the New York division, with G. A. Blackburn and A. B. Oatman asssistant managers. J. A. Hammond is managing the Pittsburgh division, assisted by F. S. Haggerson and W. E. Herr. Heading the Chicago division is H. A. Stewart, with C. H. Christensen and W. L. Julian assistant managers.

Save TIME, MONEY, MANPOWER!



"Push lines" of heavy-duty Logan conveyor installation in an Eastern steel foundry.

This Logan transfer car, operating on rails, facilitates the transfer of heavy boxes of castings from one line to another, as needed.

LOGAN *heavy-duty* Conveyor equipment helps to make hard jobs easy in this steel foundry. Roller conveyors and transfer car handle 3-ton boxes of castings from storage lines to cleaning machines *easily and economically.*

In *your* plant, Logan equipment can simplify handling and transferring materials, parts and finished products all the way from receiving platform through processing, to storage or shipping — cutting costs, speeding operations, conserving irreplaceable man-hours. Whether your operation involves heavy or light materials, you should know about the savings Logan equipment — conveyors of many types, turn-tables, transfer cars, spirals, ball transfers, etc. — can bring you. Write for free Catalog. Logan Company, 580 Cabel, Louisville 6, Kentucky.

At end of conveyor lines, boxes of castings are received or deposited for easy transfer between departments.

Logan Conveyors

Send for this helpful Bulletin now.

PUT *FLOW* INTO PRODUCTION

AMERICAN CRUCIBLE'S

SHELTON METALLIC FILLER

is rated tops by foundrymen

An improved metallic cement that sets faster and harder. If you are not using SHELTON FILLER,

***Send today for* Free Sample**

MADE IN THE LABORATORIES OF THE

AMERICAN CRUCIBLE COMPANY

SHELTON, CONN.

CONCO HANDLING EQUIPMENT

TORPEDO ELECTRIC HOIST

Available in 250-, 500- and 1000-lb. capacities for hook, bolt or trolley suspension. Features push button control, electric brake, positive limit switch, double drum construction. For *prompt* shipment.

JIB CRANE & HOIST

Revolves in complete circle; wall bracket type also available. Either model is ideal for foundry use in combination with a Conco Hoist. Real floor space savers.

SPUR GEAR HOIST

A speedy, well-built hoist in capacities from ¼-ton through 20-tons. Excellent for foundry use in connection with various Conco light cranes and trolleys.

DIFFERENTIAL HOIST

Light weight; low cost. Pays with even occasional use. Available in ¼-, ½-, 1-, 1½- and 2-tons. With Conco I-Beam Trolley is top-flight low-cost setup.

WRITE TODAY for literature on Conco Cranes, Hoists and Trolleys for foundries. Good handling equipment speeds production.

CONCO ENGINEERING WORKS

Division of H. D. Conkey & Company 53 Grove St., Mendota, Illinois

PATTERNS OF GYPSUM CEMENT

(*Continued from page* 77)

of gypsum cement, consistency at which the material is mixed, and the temperature of the water. Water at room temperature, or below, is recommended. This expansion must be provided for in making patterns and models. The slight but positive expansion enables gypsum cement to free itself from contacting surfaces and is responsible for fine detail reproduction.

Tools for cement patternmaking as shown in Fig. 3 are mostly special. They are easy to make, but are essential to doing a good job. Other tools and equipment include flat scrapers with one edge smooth and one saw tooth edge, kidney scrapers smooth and saw toothed, various size spatulas, large toothed and wide set hand saw, block planes, regular carving tools, cutting and filing tools for metal templets, angle plates and other usual devices, water facilities for frequent hand washing. Work bench may be marble, slate, plate glass or treated hard board. Iron benches may be used, but rust must be removed constantly.

Control Water Content

The error most commonly made is that of mixing with too much water which gives a soft, weak pattern. As the water ratio drops, the strength of the Gypsum cement increases as Fig. 1 illustrates. Each cement has its distinct water absorption limit, known as its normal consistency. At times it becomes necessary to vary the consistency above or below normal to produce the required bond and finish. This is particularly true in overcoming the danger of water soaking. If the set gypsum cement becomes water soaked it will not form a bond with the second mix. To compensate for this, the first mix is made below normal consistency. Making a more fluid mix does *not* retard the setting action of the cement as is very often supposed.

All mixing equipment should be clean free from set cement and other foreign material. This is important, because set cement will accelerate the set of the new mix and thereby change the entire plasticity period. Cement should be weighed, and water either weighed or measured accurately. Cement should be sifted or strewn evenly into the water. Handfuls should not be dropped into the water. The material is allowed to soak for 2 minutes and then mixed thoroughly by stirring from the bottom to force the material to the top. Care should be taken to prevent beating air into the mixture. Mixing is continued until a smooth even mass is produced. Experience will determine the correct soaking and mixing time. Mixing may be by hand or in some form of mechanical device.

For batches of 10 to 50 pounds a

(*Continued on page* 226)

AB Desiccator
Specimen Cabinet

VISIT OUR BOOTH

No. E 133

at the METAL SHOW

Buehler

Metallurgical Testing Equipment

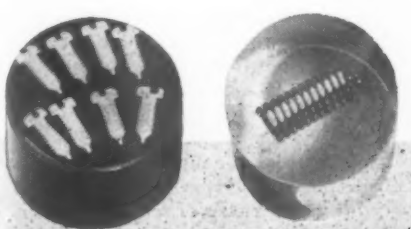
provides the metallurgist with precision tools for accurate and speedy handling of specimens.

SPECIMEN MOUNT PRESS

No. 1315

A smooth working precision machine designed for speed and accuracy in molding specimen mounts. The molding tools are lapped finished for close tolerance with a perfect fit. Either 1″ or 1¼″ molds may be used.

The solid heater, a fast working unit, can be raised and the cooling blocks swung into position without releasing pressure on the mold. The heater and cooling blocks need not be removed from the press thus eliminating the possibility of accidental burns in handling these parts. Press No. 1315 is the improved model that will develop a pressure up to 10,000 lbs.



Buehler Ltd.

A PARTNERSHIP

METALLURGICAL APPARATUS

165 West Wacker Drive, Chicago 1, Illinois

DEOXIDIZING ALUMINUM

NOTCH BARS
SHOT
SHAPES

TRADE **CEMCO EY-BARS** MARK

THE CLEVELAND
ELECTRO METALS CO.

CLEVELAND, OHIO

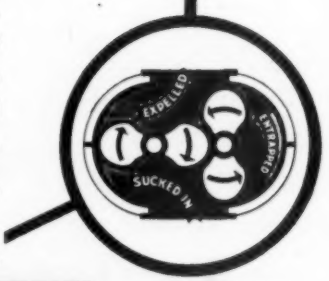
MEMBER — ALUMINUM RESEARCH INSTITUTE

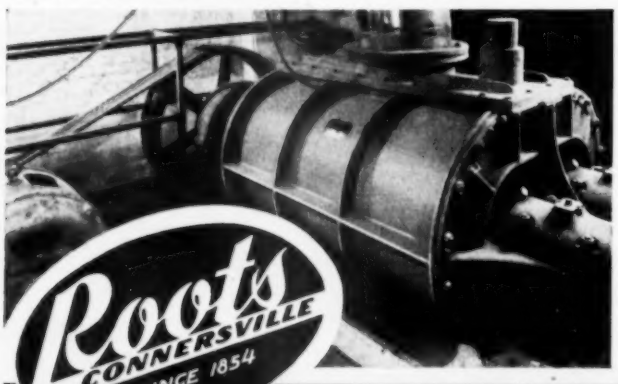
RELIABILITY *under tough operating conditions ---*

The efficient and sturdy Roots-Connersville Positive Displacement design stands up well under severe operating conditions in all foundries. Long life and dependable performance of "R-C" Blowers on really tough jobs have made them the preferred choice of experienced foundrymen everywhere. Ask for Bulletin 22-B-12.

ROOTS-CONNERSVILLE BLOWER CORP.
410 Madison Ave., Connersville, Ind.

Roots-Connersville Cupola Blower installed in a mid-western foundry. Capacity 2700 c.f.m., 484 r.p.m., 20 oz. pressure.





POSITIVE DISPLACEMENT

Twin impellers alternately suck in, momentarily entrap, and then expel definitely known amounts of air, resulting in positive delivery of four equal volumes each revolution of drive shaft. Impellers need no seal or lubrication. Capacity varies with speed. Pressure automatically builds up to overcome resistance on discharge side.

CUPOLA BLOWERS

(*Continued from page 224*)

motor rated at ¼ to 1/3 horsepower, direct drive, running at 1760 revolutions per minute will serve. A ½-horsepower motor will be required for batches between 50 and 200 pounds. The mixing shaft should be set at an angle of 15 degrees from the vertical. The propeller should clear the bottom of the container by 1 or 2 inches. During the mixing period the shaft should be about half way between the center and side of the container. A 3-inch diameter, three blade, 25-degree pitch propeller will serve for batches of 10 to 50 pounds. A similar type propeller 4 inches diameter will be used on 50 to 200-pound batches.

A templet is a piece of thin metal cut to the shape indicated on the blue print. It is used as a tool to screed or form gypsum cement to the desired shape or contour. Thickness of stock in the templet depends on the type of cement to be used. Steel or any other metal strong enough to scrape the set cement is necessary. Thickness or gage of the metal is governed by the hardness of the cement. For the hardest types, 16 gage is practical. For the softest, half hard brass 27 gage is satisfactory.

Coat Sheet with Dye

The metal sheet is prepared for scribing, or transferring the design from the blue print, by coating it with regular layout dye, supplied by pattern shop supply houses. The scribed lines show up more distinctly in the blue coating. Where a number of steps are required to complete a pattern, and where the templets are not required for future use or reference, one templet sheet is used. Successive changes as scribed on the face, are cut as the work progresses. In other instances a separate templet must be made for each step, and each one must register accurately with the others. Scribing is done with a scratch awl. With all the necessary lines in place, the templet is cut, filed and finished to follow the contour of the design. Any scratch or imperfection in the templet will be reproduced negatively in the finished pattern. The templet is attached to a wood form or device known as a sled which supports, guides and steadies the templet as it is pushed through the mass of cement. The sled may take any one of many forms, but consists basically of a slipper board, an upper part to hold the templet, and a side member which rides along the edge of the bench or any other suitable guide. This feature will be taken up later in more detail.

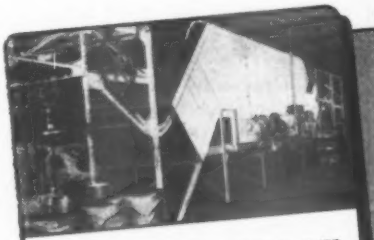
Orange flake shellac cut or thinned with pure denatured alcohol is the best material for sealing the pores of the cement. Several thin coats are better than one heavy coat. The first coat should be thin enough to be absorbed by the cement. If the surface remains glossy, the shellac is too thick. No sanding is necessary.

Evaporation of the alcohol in shellac does not make a glue. Burning is necessary to make it adhesive. The material is applied with the fingers or with a brush where pieces of set gypsum cement

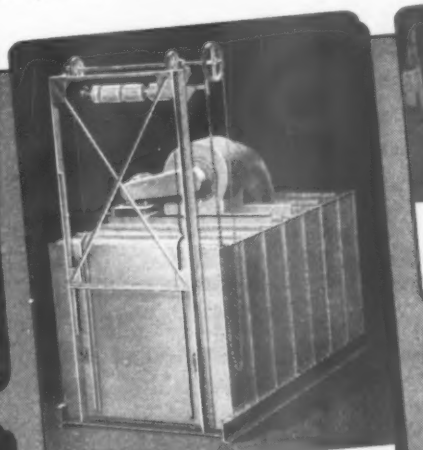
(*Concluded on page 228*)

AN *OVEN* WHEN PROPERLY ENGINEERED IS AN IMPORTANT ASSET

There are so many variables that should be considered in engineering an oven installation that there can be vast differences in both economy and effectiveness depending on the skill with which the engineering is done. • Young Brothers have been engineering ovens for all heating and baking processes up to 1000° F. for the past 40 years. Take advantage of this experience.



No. 4028. Continuous conveyor oven and automatic dip for baking the finish on metal cabinets and other parts—heated to 250°-550° F. by an internal direct premixed gas heater.



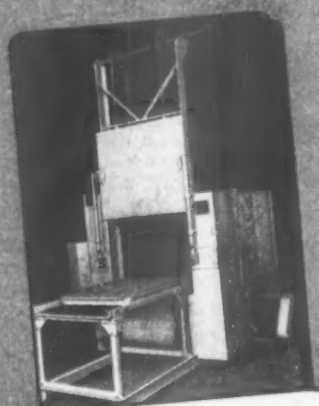
No. 3680 is a standard oven for solution or precipitation heat treatment of aluminum alloys. Electrically heated, equipped with a hand operated counterbalanced lift door and large volume air circulation, it accommodates a car 4' 0" wide, 10' 0" long and 5' 0" high.

No. 3848. Direct gas heated continuous conveyor oven for baking coated and lithographed tin sheets—operating temperatures up to 500° F.

No. 3583. External direct oil heated continuous conveyor oven for core baking—operating temperature 450° F.

No. 4132. Electric cabinet type oven for baking commutators and heat treating magnesium parts—operating temperature 180° C. A widely used laboratory type.

No. 3895. Car type mold drying oven which is heated by an external direct gas heater (at the side) and which has motor operated doors.



No. 4497B—Rolling hearth type oven for heating dies and mandrels for an extrusion press. Operating temperature 1000° F.

No. 3629. Steam heated continuous conveyor oven for baking sprayed enamel on sheet metal stampings—operating temperatures 130°-160° F. Time, six minutes and up.

YOUNG BROTHERS COMPANY

6508 MACK AVENUE • DETROIT 7, MICHIGAN

YBCo

ESTABLISHED IN 1896

You lift a 2,000 lb. load from the floor quickly and without strain by a pull of only 63 lbs. on the hand chain of a multiple gear Reading Chain Hoist. Even for hoists with the maximum capacity of 20 tons, a pull of only 170 lbs. on the chain is needed.

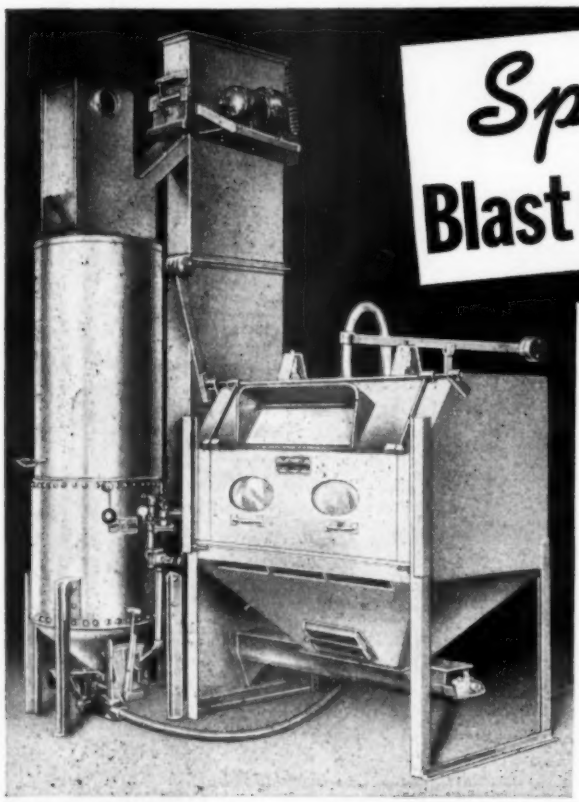
The high efficiency and speedy operation of the Reading Multiple Gear Chain Hoist are due to its spur gear design—in which a balanced train of gears operates in a bath of oil. Adequate lubrication of moving parts is also assured by the use of *sealed* ball bearings. Safe, easy hoisting is also assured by the self-adjusting brake that automatically takes up its own wear. The positive braking action simplifies hoisting and holds the load stationary at any point.

For help on hoisting problems either by use of chain hoists or electric hoists, write for "Modern Materials Handling Magic."

READING CHAIN & BLOCK CORPORATION
2108 ADAMS ST., READING, PA.

CHAIN HOISTS • ELECTRIC HOISTS • OVERHEAD TRAVELING CRANES

READING HOISTS



Speedy Blast Cleaning

Ruemelin Blast Cabinet provides a fast cleaning action by direct pressure blast. Handles a great variety of jobs. Simple to operate. No skilled labor needed. Sanitary. Operator need not wear helmet. Front door loading. Saves footsteps and floor space. Low maintenance cost. No pits or foundation required. Shipped assembled for low installation cost. Handles all classes of abrasives. Over 1,000 in service in foundries, welding shops, steel treating plants, airplane factories, etc. Write for bulletin 32-B.

RUEMELIN MFG. CO.
3850 N. Palmer Street
Milwaukee 12, Wisconsin

RUEMELIN Blast Cabinets

A 4397-⅛

(*Concluded from page 226*)

are to be glued together.

Cut shellac to be burned is poured into an open vessel where it can be set afire. Size of the vessel depends on the amount of shellac wanted, but the cut shellac should be at least ½-inch deep. It is set on fire and stirred intermittently. The fire is snuffed out when bubbles cover about one third of the surface. A skin will form over the shellac after it cools. This acts as a protection and the shellac may be used indefinitely as long as it remains moist beneath the skin. The skin is not used when applying the material. In practice both surfaces to be joined or glued must be primed with several coats of regular cut shellac. As soon as the primer is dry, the burnt shellac is applied.

Parting compounds for separating one layer of gypsum cement from another include stearic acid, petroleum jelly (vaseline), lard oil, light lubricating oil, carnauba or bayberry wax, soap, spirits of camphor.

Five principal methods are employed in making gypsum cement patterns. Each is suited to a particular type of pattern. It is not necessary to be proficient in all methods to make many simple patterns, but after one process is learned, skill will be developed with other methods. The five methods include: 1—Run work, or screeding a straight shape. 2—Run work in such shapes as square, rectangular or oblique. 3—Turned work on the bench. 4—Rod or box turning. 5—Built-up work.

(*To be concluded*)

Book Review

Practical Metallurgy for Engineers, cloth, 479 pages published by E. F. Houghton & Co., Philadelphia. Price $3.

Compiled by the research staff of E. F. Houghton & Co., this is the fourth edition of a well known work. Last published in 1929, the present book has been completely revised to bring it up to date, and deals primarily with metallurgy and heat treatment of steel. Essentially the volume is divided into two parts; the first being devoted to a discussion of the basic principles, and the second to processes of heat treatment. First chapter relates to physics and chemistry of metallurgy, and the second to metals and their ores. Fuels, refractories, nonferrous metals and iron ores are discussed in the next four chapters, while three chapters are concerned with manufacture of iron and steel, mechanical treatment, temperature measurement and heat treatment of steel.

Other subjects covered include quenching, grain size and hardenability, testing and inspecting, metallography, heat treating furnaces, steels used for carburizing, carburizing materials, procedure control and equipment, containers, selective case hardening, carburizing and hardening troubles, liquid salt baths, heat treatment of aluminum alloys, steel classification and specifications, service rendered to the metal industry, and reference data.

HARD
•
TOUGH
•
STRONG
•
HIGH IMPACT
•
UNIFORMLY FINE GRAINED

yet . . .

MACHINABLE AT HIGH SPEEDS
•
EXCELLENT FINISH
•
FREE FROM HARD SPOTS

How to combine all these properties in one iron

BY adding "Ferrocarbo"—the silicon carbide reducing agent—to a properly adjusted charge, you can secure all these properties in your processed iron *easily* and *economically.*

When "Ferrocarbo" is added to a charge, oxides are reduced and eliminated by the powerful deoxidizing action of *nascent* carbon and *nascent* silicon.

Accompanying this deoxidation there is an increase in temperature and iron fluidity which produces denser, finer-grained castings of higher strength.

Such castings are tough, uniform in structure, and possess improved resistance to both wear and impact.

They can be easily machined at high speeds to an excellent finish. No hard spots are present to shorten tool life.

Extensive experience has proved you get fewer rejects when you deoxidize with "Ferrocarbo."

Available in Briquette or Granular Form

As "Ferrocarbo" is relatively inexpensive in either form, the nominal amounts required mean high-quality iron at low cost.

Write for additional information on "Ferrocarbo" and its use in your foundry.

"Carborundum" and "Ferrocarbo" are registered trade marks of, and indicate manufacture by, The Carborundum Company.

THE CARBORUNDUM COMPANY
REFRACTORIES DIVISION, Perth Amboy, N. J.

"Ferrocarbo" distributors: KERCHNER, MARSHALL & COMPANY, Pittsburgh & Cleveland. MILLER & COMPANY, Chicago, St. Louis & Cincinnati

Ferrocarbo by CARBORUNDUM
TRADE MARK

CHECK
BLOWERS
AND EXHAUST
SYSTEMS
Instantly
with the *Alnor* Velometer

This instantaneous direct reading air velocity meter measures air speed in feet per minute. There are no calculations, no timing, no conversion tables; its use is so simple that anyone can take accurate measurements with the Velometer. Extension jets permit correct readings in many locations that would be difficult or impossible to reach with other means of measurement.

Keep exhaust equipment working efficiently by regular checks for draft, leaks, blower operations, etc., with the Alnor Velometer. You can get accurate information on performance with a few minutes' inspection at regular intervals.

The Velometer is made in several standard ranges from 20 fpm to 6000 fpm and up to 3 inches static or total pressure. Special ranges available as low as 10 fpm and up to 25000 fpm velocity and 20 inches pressure. Write for Velometer bulletins.

ILLINOIS TESTING LABORATORIES, INC.
420 NORTH LA SALLE STREET
CHICAGO 10, ILLINOIS

1905 Strand 1944
FLEXIBLE SHAFTS

SWIVEL BENCH
TYPE MWH

FLEXIBLE SHAFTS
AND MACHINES
ONE HUNDRED TWENTY-FIVE TYPES
LARGEST EXCLUSIVE BUILDERS

VERTICAL
THREE SPEEDS

SEND FOR CATALOG

FLOOR TYPES
SWIVEL YOKE MOUNTINGS

Hand Cut
High Speed Steel
Rotary Files and
Ground Cutters

N. A. STRAND & COMPANY
5801-5009 No. Wolcott Ave. · Chicago 40, Ill.

FACILITIES FOR QUENCHING STEEL CASTINGS

(*Continued from page* 84)

back to the right for each steel, making the necessary critical cooling rate less, or making it possible to quench out heavier sections at the same critical cooling rate.

There are no mathematical formulas or charts that can be wholly depended upon in figuring out the proper cooling rates of any quench medium; they are all unsound, due to necessary assumptions. Various calculated methods are aids in determining the proper coolant or the approximate size and volume of the tank. Every job or type of steel must be experimentally worked out if accurate practice is to result. The factors involved are as follows:

1—Surface per unit of volume.
2—Size and shape of the piece.
3—Temperature of the water.
4—Temperature of the casting when quenched.
5—Diffusivity of the casting.
6—Surface condition of the steel.
7—Liberation of gases in the bath.
8—Methods of introduction into the bath.
9—Circulation and agitation of the water.

From this it can be seen that each item must be carefully studied as well as understood in order to attain any degree of consistency or accuracy of quenching. One quenches to do a particular job, and it is necessary that every rule be followed on every quench, if the proper results are obtained. Once the factors affecting the quench are known, equipment may then be considered.

The types of equipment being generally accepted and used in steel foundries can be divided into three groups:

Batch quenching. This covers a large variety of types from one single furnace load to several group loads in one furnace. The work is charged in a batch furnace and either removed as a total and quenched, or removed in smaller units and quenched. Large, individual, bulky castings work well when quenched from a batch furnace. One of the best examples of the batch type is as illustrated in Fig. 1.

This arrangement allows good control of heating and dependable reproduction of withdrawing loads from the proper heat and delivering to the quench. Once all these factors are worked out and the necessary heat or quench is determined, good duplication is possible. One difficulty in using batch-type furnaces is the tendency to let the desire for higher production and low cost influence one in piling castings together in loads. By so doing the castings are hindered and shielded so that it is utterly impossible for the water in the quench to cool all parts of the castings properly at a cooling rate to completely harden them.

(*Continued on page* 232)

THIS chunk actually contains only 2% LITHIUM — approximately ½ ounce. The other 98% consists of Cu, Zn, or bronze proportioned to match your melt. Yet this small quantity of metallic LITHIUM is sufficient to remove hydrogen and other gases, oxides, sulphides and other non-metallic impurities from a 200 pound melt of copper or bronze.*

LITHIUM metal works because it combines with these impurities forming non-metallic compounds of low specific gravity, insoluble in the melt and having a melting point below the casting temperature of the metal. These compounds volatilize, or flux out quickly, thus increasing the fluidity which often permits lowering pouring temperature. As a result, your castings are clean and sound, possessing optimum physical characteristics.

LITHIUM treatment requires no new technique, no new equipment, no special training for your crew. Our technical staff and our own casting facilities can be placed at your disposal.

*Tin bronze or silicon bronze.

10-LC-3

LITHALOYS CORPORATION

444 MADISON AVENUE, NEW YORK 22, N. Y.

WHAT SHALL IT BE?

There isn't room for "good enough." A casting *must* be GOOD—and no qualifications—the kind you like to run your hand over, feel proud your foundry turned out. FOSECO makes *that kind* of casting. There's a FOSECO product for *every* alloy. Write today, make *your* test.

FOUNDRY SERVICES, INC.

280 Madison Avenue
New York 16, N. Y.

(*Continued from page* 230)

Some foundries use batch furnaces from which to quench, and the work is removed from the car by various types of hooks and bails. This type can be very efficient or very deficient in quality control. The dependence upon the human element; that is, complete co-operation between cranemen and men placed to get the castings, fixtures, or racks coupled to the hooks or bails, is the making of success or failure on this type of quenching. Eliminating the variables as much as possible, or the change in time between the opening of the furnace door and the actual quenching, is of vital importance.

Semicontinuous quenching: This is best handled by a longer furnace of some pusher-type arrangement where, when castings are loaded and pushed, the equivalent area of furnace load is pushed out by the same pusher mechanism; or where only one door opens at a time, the quench load is then pulled and quenched, leaving a vacant area to be filled by the pusher when the outgoing door closes and the ingoing door opens. The latter procedure has the advantage in less heat loss, furnace draft, and cleaner resulting work. The two probably current types of such equipment are shown in Figs. 2 and 3, the first being the type to handle all size castings up to probably 3000 pounds, depending upon the overall size.

Fig. 3 shows the bail-type of lifting mechanism. The bail can be quickly attached to the rack and moved directly to the quench. One type of loading racks used is shown in Fig. 4.

This rack is cast in an open mold. It is well spaced and latticed, and provides for good heating and quenching.

Move Castings Up and Down

The overhead crane in quenching this type of work, even though the quenching tank has good circulation, should continuously move the casting up and down and slightly from side to side while in the tank. This aids in more uniformity in the quench, and makes for less cracking and less distortion.

The second type, the semicontinuous furnace, is excellent for the general run of heat treating steel castings. It is efficient, easy to man, and very uniform in production. These units often are installed with the pusher-type mechanisms on roller rails, and a pull-out mechanism on the quench end. When one or two or four trays (depending upon type of castings and the area needed) are pulled out on the outside rollers, the operator pushes the button and the rollers tip up and hold the tray in place while sliding the castings into the quench or out onto a suspended rack. Fig. 5 shows a load of castings from the semicontinuous furnace about to slide into the quench.

In some instances it is advisable to suspend a rack at some distance below the surface of the water in the quench tank. The castings would then fall through the water until striking the rack. This rack can then be raised or lowered during the quench, or remain at any desired point. This method lends itself to excellent and uniform quenching and a minimum of distortion and cracking. If, however, practices dictate that the castings are to be slid onto the rack before quenching, this can be done by having the rack in the raised position while the castings are being dumped or slid from the trays. If the timing or delayed quench is necessary, it can be handled by this latter system. Details of the quench tank are shown in Fig. 6.

The capacity of the tank shown in Fig. 6 is 10,000 gallons with a possible inflow of new water up to 2000 gallons a minute. The combination of recirculation and inflow of new water makes it possible to maintain quench water temperatures within 30 degrees F. all during the operations.

After the proper time has elapsed for quenching the castings, the rack is raised, and castings are removed therefrom by built-in, overhead, remote control cranes, as shown in Fig. 7.

Other arrangements used with the same type furnace for larger and special castings are shown in Fig. 8.

Maintain Water Temperature

It is good practice to maintain a quenching system in which not more than a 20-degree rise in temperature occurs in the quench medium. This is much more important in water quenching than in oil quenching. It should be emphasized that the volume of quenching medium is very important and must be great enough to permit continued quenching without appreciable rise in bath temperature. Furthermore, the relation of the size of the quench tank to the size of the largest casting to be quenched should be such that this casting may be moved freely during cooling to insure uniform extraction of the heat.

It may be that operating economies will necessitate provision of external refrigeration to maintain the recirculated water at the desired temperature. There are various manufacturers producing these units, and it is believed that some foundries are so equipped. The use of automatic temperature controls in the water bath connected with such cooling mechanisms is very successful in maintaining a desired temperature at all times.

High velocity of the quench water exerts a pronounced influence on promoting more rapid and uniform quench. When it is considered that critical cooling rates are dependent upon the rate of transformation of austenite in the range close to the upper critical, say 800 to 1000 degrees Fahr., one realizes the importance of a thoroughly effective quench in the early cooling stages.

A unique method used in at least one instance is the tank shown in Fig. 9. The quenching rack is attached to a double-action cylinder controlled by a three-way valve on the side. The castings are set on by a crane, or pushed on from the continuous-type furnace. The rack is then lowered into the bath. It can be raised up and down at will for additional agitation, by the operator con-

(*Continued on page* 234)

You'll find it much cheaper

to give your men these

Instead of these

Protect your production... with AO Safety Goggles

American Optical
COMPANY
SOUTHBRIDGE, MASSACHUSETTS

RADIANT Since 1879 FACINGS

MANUFACTURED IN OUR OWN PLANT...

DISTRIBUTED FROM OUR WAREHOUSE

BILL GAGGER SAYS:

ON THE JOB
After the Civil War and Every War Since—
RADIANT FACINGS

MAKING
BETTER
CASTINGS FOR
64 YEARS

WE MANUFACTURE
Core Compounds
Core Washes • Blackings
Plumbago • Seacoals
Parting Compounds
Tripoli—Low Silica—Liquid
Core Pastes and Binders
Shake Bag Facings
Anti-piping Compounds
"Ferrograph" Graphitizer
Special Facings & Compounds

WE WAREHOUSE
Purite • Goulac • Glutrin
Bentonite • Silica Flour
Soapstones and Tales
Truline Binder

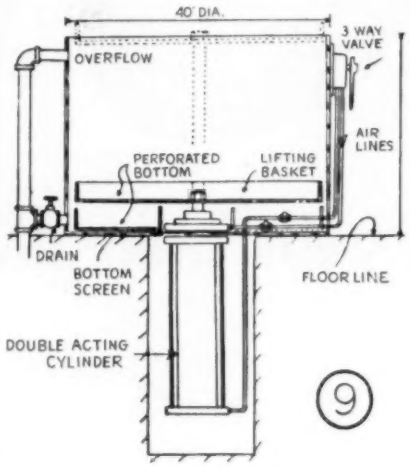
The Smith Facing & Supply Co.
1857 Carter Rd., Cleveland, Ohio

(*Continued from page* 232)

trolling the valve on the side of the tank.

Other methods of agitation of the water are used, one being that of mechanical agitators, such as propellers which produce rapid circulation of the liquid within the quench tank. These should be arranged as to provide a rapid flow of the medium around the piece being quenched. This should, however, supplement the flow in and around the tank for most effective use. It is believed that the most effective method of recirculation is the modification of pressure quenching (Fig. 6). The water is forced directly at the casting and around them by use of well arranged pressure jets or nozzles. This method gives a splendid quench.

In general, it must be remembered that in designing quench tanks, regardless of the volume of quench water, the effective quench volume is that which is in direct, effective proximity to the steel castings. Therefore for best designing it should be kept in mind that a large



Quenching rack attached to double-acting cylinder is lowered into bath

spread-out area will not be as effective on recirculation as a more confined one. Here again the type of casting regulates what the area must be. At least, when using a formula such as that which follows, one must take cognizance of considerations beyond mathematical results.

$$\frac{W \times \text{Sp. Ht.} \times (T - t)}{\text{sp. ht.} \times w \times R} = \text{cubic feet of quench medium}$$

W = weight of material; Sp. Ht. = mean specific heat; T = temperature of heated material; t = temperature of material at time of quench; sp. ht. = specific heat of quench medium; w = weight per cubic foot of quench medium; R = allowable temperature rise of quench medium.

This formula gives an accepted method for figuring the amount of gallons of any quench medium. This or any other formula is only approximate, and all the factors concerned must be allowed. How much of the volume actually is utilized in quenching this work? How does the recirculation force the water around the work—up through the center, around the tank, on the work, etc.? This formula or any other formula should in all cases be used as the basic possible minimum and a liberal safety factor used over and above the essentials called for here.

Table I shows a compilation of foundry tank sizes, volumes, circulation, and possible tonnage quenched, taken from a considerable number of the foundries water quenching steel castings today. It is believed that the table will show the consensus of what today's requirements are in order to obtain satisfactory quenching operations. Column No. 4 shows the importance placed upon recirculation.

Continuous quenching: The completely continuous system is only slightly used by steel foundries, except for some specialized job and then for relatively small castings where large quantities are handled. If a foundry has such a schedule, the continuous system is an ideal method from the standpoint of economy, metallurgical control, and consistent results. In the continuous system a smaller amount of tonnage than otherwise is introduced into the quench tank at any particular moment, and the work gets an excellent quench. Generally, it is then automatically removed and placed in the draw furnace by mechanical handling means.

Employ Many Clever Devices

The chief requirement on continuous quenching is a reliable, fool-proof, mechanical handling system, and many clever devices of that kind are being employed today. The work is discharged from the furnace by means of a chute, and the castings fall through the water onto a submerged conveyor which, in turn, carries the castings out of the quench tank onto an unloading platform or to the draw furnace. The conveyor can be set for any speed necessary to handle the timing cycle on the hardening furnace and to insure the proper quench time for the particular work at hand. A good example of the use of this type of furnace is that of cast steel shell, track shoes and work of that nature.

In the construction of quench tanks, elevators, and auxillary equipment, one should make sure that everything is built with enough strength and rigidity to take the worst possible abuse because cranes drop loads, cables break, operators get careless, and numerous other mechanical failures may occur which must be taken into consideration.

The quench tank should be placed as far into the ground as possible with only a minimum of the top being above the ground level. However, there is some difficulty in draining and properly cleaning out scale, sand, and refuse when the tank is of the submerged type. It is possible and practical, though, to build a sunken drain at the base of a submerged tank in which room is allowed for draining and pumping out sludge and dirt without too much trouble. For the added conveniences and adaptability of the quenching practices, it is not wise to allow the physical effort here to unbalance the metallurgical better judg-

(*Concluded on page* 236)

IT PAYS TO SPECIFY...

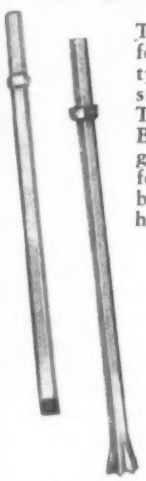
GENUINE *Thor* ACCESSORIES

...for all Pneumatic Tools

BECAUSE THEY ARE MADE TO FIT THE JOB BY PNEUMATIC TOOL MEN WHO KNOW MINING NEEDS!

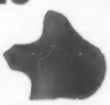
To *save you time,* Thor Air Tool Accessories are designed to *fit* the job... and do it *right* by Thor Pneumatic tool engineers who *know mining needs!* To *save you money,* Thor Accessories are durably built to help you get the *most* from your air tools. Two good reasons why – whatever your needs – it *pays to specify* "Genuine Thor Accessories."

DETACHABLE BITS & ROCK DRILL STEELS



Thor makes available for rock drilling in all types of formations sturdy, fast-cutting Timken Detachable Bits. All standard gauges from 1⅜" to 2⅝" in four-point, six-point or chisel bit styles with center or side holes.

ROSE BIT

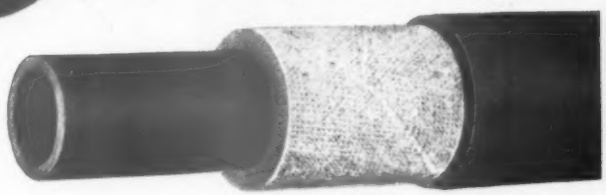


CROSS BIT

CHISEL BIT

- Seven sizes of Thor Hollow Steels for these detachable bits used with hand-held drills, and seven sizes for drifter drills, all specially heat-treated for durability in toughest formations.
- Five Thor Hollow Drill Steels with four- or six-point bits in two size ranges – with ⅞" Hexagon steel and 3¼" collared shank, and 1" Hexagon steel with 4¼" collared shank.

Thor AIR & WATER HOSE



OIL RESISTANT

DURABLE

You get protection against both inner and exterior wear with Thor Wrapped Air and Water Hose. Multiple plies of light, yet tough rubber compounds combine with this protection important advantages of flexibility and durability. The inner tube is protected against flaking and decomposition from oil in the air stream by a special oil-resistant compound. Cover consists of a tough, abrasion-resistant rubber compound that withstands roughest usage.

Thor HOSE FITTINGS

Thor Hose Fittings for use with all types of Air and Water Hose are specially designed to withstand severest conditions in mines, quarries and on construction jobs. Solidly constructed of high quality steel, heat treated for durability. Each coupling consists of stem, nut packing, washer, clamp and spud, which is furnished with either male or female thread for connection to the pipe or machine.

HOSE CLAMP | HOSE STEM | HOSE UNION NUT | HOSE SPUDS | HOSE UNION NUT | HOSE STEM | HOSE CLAMP

Thor *Portable Pneumatic and Electric Tools*

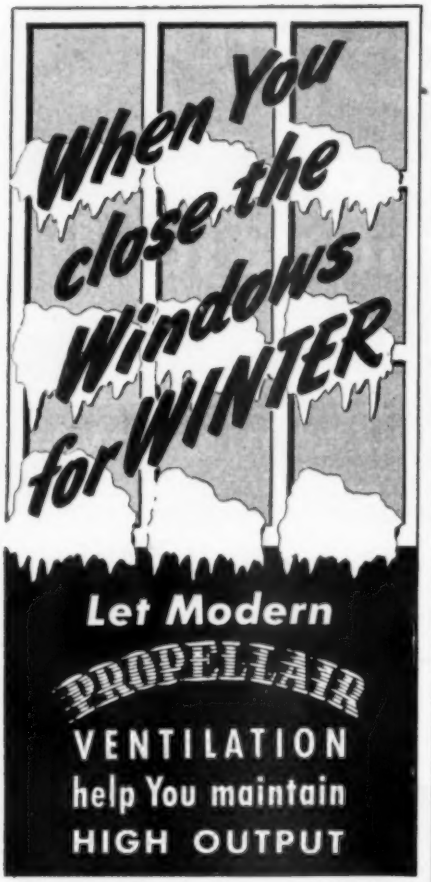
INDEPENDENT PNEUMATIC TOOL COMPANY

600 W. JACKSON BOULEVARD, CHICAGO 6, ILL.

Branches in Principal Cities

PROMPT DELIVERY! Thor Air Tool Accessories *available now* ... write for complete information, specifications and prices.

6200 E. SLAUSON AVE., LOS ANGELES, CAL.
315 S. VAN NESS AVE., SAN FRANCISCO, CAL.
1741 FIRST AVE., S., SEATTLE, WASH.
54 E. FOURTH, S., SALT LAKE CITY, UTAH



Dust, Moisture, Fumes, Heat soon will launch their annual offensive of absentee-upping and tonnage-shrinking behind windows closed for winter. Fortify your foundry now with the best in modern ventilation. War demands can't wait on the seasons!

Airfoil-Section Blades Assure Top Efficiency

Compact Propellair ventilation serves foundries in many ways, in many places—delivers largest air volume from lowest horsepower—is easily installed in ducts, walls, windows; on floors in integral cradles or pedestals; on roofs—helps you turn out better work, faster, both now and the year around. Get the facts today.

Entrance Ring Is Curved for Greater Volume

FREE—THIS "HOW" BOOK

72 pages of research results by a leader in the field, with facts, figures, tables and charts. Here's the answer to your ventilation problems. Ask for Book No. 10.

"MOVING AIR IS OUR BUSINESS"

PROPELLAIR
INC.
SPRINGFIELD · OHIO

(*Concluded from page* 234)

ment of the tank placement.

Most tanks are being built of rather heavy steel plate, depending upon the size of the tank in question, with all seams welded, both inside and outside. The tank should be well reinforced at various depths with cross ties and supports, dependent upon its size. The interior of these tanks should be waterproofed as often as possible, to promote long life.

In one case a quenching tank built when steel plate was not available, was constructed of concrete, and it has been satisfactory during the 3 years of constant usage. This tank was built separate from the floor and was slid into position from a distance of at least 25 feet. The circulation and feeds are arranged very well, and in general it is a satisfactory quenching unit, despite having been rather quickly and cheaply constructed.

Another type of heat treatment that undoubtedly will increase in popularity in the next few years is that of flame

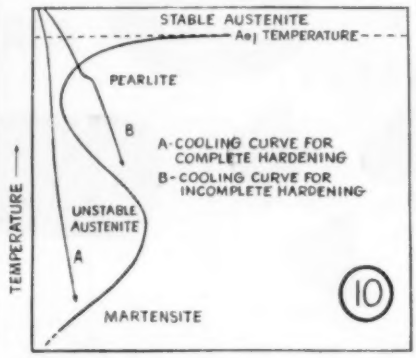


Fig. 10—*Cooling rate must be in left area of S-curve knee*

hardening. This method employs the heating of certain specified faces, projections, or portions of a part of a steel casting above the critical temperature by means of an open burner arrangement, and subsequently quenching to develop hardness only where desired without affecting the core or body of the piece. This method of heating is followed by pressure spray water quench, or the immersion method into a tank. Results have been very good on special application, and it would be well to take stock of this application for postwar work as well as for the present.

Possibly no paper today on hardenability or quenching would be complete without mentioning the Jominy test. This test is certainly one of great value, even to the heat treater of steel castings.

Two types of cooling curves may be mentioned here; one gives full hardenability and the other gives any particular stage of hardenability as it might develop. It is necessary on every steel to keep the knee of the S-curve, as shown in Fig. 10, in mind, and the cooling rate for the heaviest section must stay in the area of the left side of the knee in order to harden and quench properly. Any cooling rate other than this will give a completely unsatisfactory and unreliable quench.

Under ordinary conditions of steel quenching of a casting, there will be a layer of vapor between the casting and the quenching liquid. The basis of the theory of quenching is that to quench a piece, the insulating film of vapor must be kept to a minimum so that the water or quenching medium may be as uniformly next to the surface of the steel casting as possible.

Wherever areas of gas are allowed to remain and separate the work from the actual water, soft spots and improper quenching take place. This is why it is so vitally necessary for the circulation and the motion of the quench to be proper at all times. The work should not be allowed to pile, nor the liquid to become stationary. Where film walls are allowed to remain and hinder the water from doing the job intended on the steel casting or part of it, improper work will result. In Table II are shown the values of H for oil, water and brine under various conditions of agitation.

TABLE II—VALUES OF H

Agitation	Oil	Water	Brine
None	0.25-0.30	0.9-1.0	2
Mild	0.30-0.35	1.0-1.1	2-2.2
Moderate	0.35-0.40	1.2-1.3	
Good	0.40-0.50	1.4-1.5	
Strong	0.50-0.80	1.6-2.0	
Violent	0.80-1.1	4	5

In summarizing, the following should be kept in mind:

Know your steel and your heating and cooling criticals. Know the effective, necessary cooling rates for the steel and sections involved. Know the actual quenching temperatures and possible variables. Know the operating equipment and know the water bath. Put the above six items on a workable basis, and put men in charge of them who understand their importance. When this procedure is followed, water quenching will continue to be successful, and the use of good steel castings will increase rather than diminish, both in time of war and peace, but watch that quench!

Book Review

Magnesium, Its Production and Use, by Ernest V. Pannell, cloth, 137 pages, published by Pitman Publishing Corp., New York. Price $4.

This book first printed in 1943 was reprinted in 1944, and as its title indicates, deals with production of metallic magnesium from available ores, and its applications. Divided into two parts the first discusses the various methods in use or projected for production from raw materials, and the second describes the various alloys of magnesium, their handling and uses. First three chapters constituting the first part relates to general properties of pure magnesium, sources of magnesium, and production methods.

Remaining chapters forming part II discuss alloy compositions, heat treatment, casting, working, corrosion and protection, and industrial applications.

PLAN YOUR PLANT DRIVE NOW!

Good organization will be needed to sell the 6th. The task of raising the huge sum required will be the most difficult ever asked of Industry. As each new military success brings us closer to Victory, the public naturally will feel that the urgency of war financing is lessened—whereas it isn't. So organize now to prevent a letdown on the home-front from causing a letdown on the fighting front. Build your plant's payroll campaign around this fighting 8-Point Plan. You don't have to wait for the official Drive to start—swing into action NOW!

1 **BOND COMMITTEE**—Appoint a 6th War Loan Bond Committee from labor, management and each representative group of the firm.

2 **TEAM CAPTAINS**—Select a team captain, for each 10 workers, from men and women on the payroll—but not in a supervisory capacity. Returned veterans make most effective captains.

3 **QUOTA**—Set a quota for each department and each employee.

4 **MEETING OF CAPTAINS**—Give a powerful presentation of the importance of the work assigned to them. Instruct them in sales procedure. Have them carefully study the Treasury Booklet, *Getting the Order.*

5 **ASSIGNMENTS**—Assign responsibilities for:
(a) *Music, speeches and announcements of the opening rally.*
(b) *Pre-drive letter to employees from management and labor.*
(c) *Competitive progress boards.*
(d) *Meeting schedules, etc.*

6 **CARD FOR EACH WORKER**—Dignify each personal approach with a pledge, order, or authorization card made out in the name of each worker. Provide for a cash purchase or installment pledge. Instruct each captain to put a pencil notation on the card to indicate the subscription he expects to solicit from each worker.

7 **RESOLICITATION**—People don't mind being asked to buy more than once. Resolicit each employee toward the end of the drive in a fast mop-up campaign. Call upon your State Payroll Chairman; he's ready with a fully detailed plan—NOW!

8 **ADVERTISE THE DRIVE**—Use all possible space in the regular media you employ to tell the War Bond story.

The Treasury Department acknowledges with appreciation the publication of this message by

THE FOUNDRY

This is an official U. S. Treasury advertisement prepared under the auspices of Treasury Department and War Advertising Council

YOU DON'T NEED

Glasses TO SEE

VALUE HERE

American-Heanium nozzles have a low first cost. Compare the $8.00 to $10.00 price with other *good* nozzles and you'll have the story.

American-Heanium nozzles are Long-Lyfe Nozzles which make the cost per hour extremely low. This, plus the many hours of uniform blasting efficiency, is your assurance of real value.

American-Heanium nozzles give advantages in reduced labor and blasting time—reduced air consumption—all of which means reduced cleaning costs.

Specify American - Heanium Long - Lyfe Nozzles with the alloy steel jacket (a) and the ceramic insert of nearly diamond hardness (b). Once you've used them you'll know what we mean . . . you don't need glasses to see value here.

American Foundry Equipment Co.
505 S. Byrkit St., Mishawaka, Indiana

AMERICAN HEANIUM

LONG LYFE

NOZZLES

EFFICIENT USE OF COMPRESSED AIR

(*Concluded from page* 81)

gage pressure, proceed vertically downward to the intersection with a horizontal line representing 1000 cubic feet per minute; then parallel to the diagonal guide line to the intersection with a horizontal line representing a 4-inch pipe; then vertically downward to the pressure loss scale at the bottom. In this case the loss is indicated as 0.225-pound per square inch per 100 feet of pipe.

The location of air receivers, even with piping of ample size, is another extremely important item and one which has a very direct bearing on the size of the compressor required for a given compressed air distribution system. In addition to a receiver on the compressor discharge, if the distribution system is fairly large or if certain parts are subjected to heavy instantaneous peaks, the installation of additional receivers at strategic points in the system is worth considering.

Compressed Air Devices—The foundry is a fertile field for the use of air devices, pneumatic lifting cylinders, etc., all of which go to make the average foundry plant more efficient. Everyone is familiar with the use of compressed air in molding machines, core rollovers, jarring machines, sand blasting, etc., but there are many other places where compressed air may be utilized, such as in the elimination of heavy lifts where women coremakers are employed, by letting compressed air do it. Pneumatic cylinders and various gadgets may be utilized by the clever master mechanic in any number of ways. An example may be cited of having a pneumatic cylinder operating a second set of rolls in a roller conveying system for the handling of small flasks where the load may be transferred from one set of rolls to another for right angle turns.

Maintenance of the Compressor—The compressor is the heart of the compressed air plant, and recommendations of the manufacturer should be followed closely in changing oil, cleaning filters, cleaning compressor valves if necessary, draining aftercooler separators and receivers, and cleaning the cylinder jackets and the intercooler and aftercooler tube nest, in case conditions may be such that these parts become dirty. Clean, scale-free cooling water should be used whenever possible. When mechanical parts of the equipment show signs of not operating normally, they should be investigated at the first opportunity.

Particular care should be taken to make certain that lubrication of compressor cylinders is adequate but not excessive, as excessive quantities of oil in the discharge line or in the receiver are a fire hazard, especially if no aftercooler is used. Heavy carbon deposits in the discharge line adjacent to the compressor may become ignited should there be a cause for excessive discharge temperature, such as a leaky discharge valve. Manufacturer's recommendations should be followed carefully in the quality and quantity of lubricating oil in the compressor cylinders.

One of the important losses in any compressed air system is leakage at piping joints. In the average foundry, there is so much noise that the buzz of air leaks is not noticeable. The system should be tested periodically after the plant is shut down and when absolutely no air is used, by shutting off all tools and then running the compressor to determine the capacity at which the machine must operate in order to maintain the air pressure at the usual point. This is the best check on the amount of leakage occurring in any plant, and it is found only too frequently that this leakage represents an appreciable part of the compressor capacity. A compressed air piping system must be continuously followed up, especially at hose connections in order to eliminate this constant source of loss.

Maintenance of Devices—These consist in the main of some form of pneumatic cylinder, and, when it is considered that many of these devices are allowed to operate with water in the compressed air and practically dry without oil, it needs little additional elaboration to show the desirability of giving these devices a little attention at intervals to check rapid wear. It is a common sense rule to give these devices compressed air free of water and see that the cylinder gets a little oil occasionally. Also remember that pneumatic tools are precision tools built to rigid standards and tolerances. They need proper care; inspect often, and keep them properly lubricated.

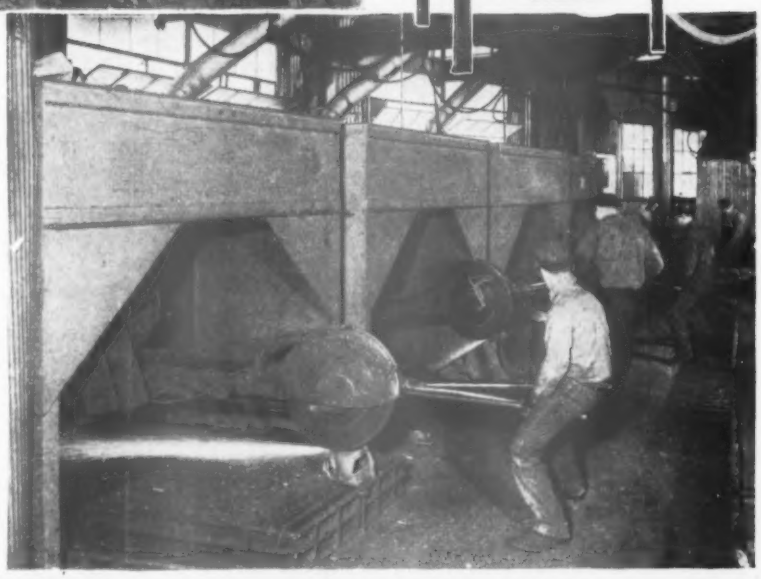
Safety, too, enters into the foundry picture, since inadequate maintenance invites breakdown and accidents. Compressed air is one of the safest known media for power in the average industrial plant, and if accidents occur through the use of air, it is because some phase of maintenance has been neglected. During this critical war period, proper maintenance of compressors and air tools has aided greatly in increased production through greater safety and less shutdowns, as well as lowered costs.

Crucible Melters' Handbook Issued

A handbook on crucible melting has just been issued by the Crucible Manufacturers Association. Illustrated throughout, the book is a treatise on crucible furnaces, and the storing, handling and use of crucibles. Printed in pocket-size, the book is intended to be a practical refresher for the long experienced man and a valuable aid to those newer in the work. A copy may be had by addressing the association, 90 West Street, New York, 6.

. . . . ROTO-CLONE
dust control systems are ideal for swing frame grinder dust

The superior performance characteristics of the Type D Roto-Clone, the minimum of space required for its installation, and the savings effected in piping and power make it especially suitable to swing frame grinder dust control.



COLLECTING SWING FRAME GRINDER DUST is no problem with Roto-Clone on the job. All dust is confined within booths and the finest particles collected by the Type D Roto-Clone combined exhauster and dust collector, thus preventing the dispersion of grinding dust to the work room. Shown on this page are two typical Roto-Clone set-ups illustrating two types of booth enclosures for the grinders. Complete engineering data describing the use of the Type D Roto-Clone for other foundry applications is available on request.

AMERICAN AIR FILTER CO., Inc., 266 Central Ave. LOUISVILLE 8, KY. IN CANADA: DARLING BROS., LTD., MONTREAL, P. Q.

ROTO-CLONE
For Foundry Dust Control

IMMEDIATE DELIVERY
on the
NEW
"RAPID" HAND SQUEEZER
$122.00

Will handle a lot of your bench jobs and save you money by trebling your production.
Handles flasks up to 16 x 30 inches.
Comes complete with benches.
Portable or Stationary Type.

★

"RAPID" R9X JOLT
30% increased jolt capacity

$205.00

JOLT VALVE KNEE-OPERATED

A Foundry producer of good molds for over 20 years.
Simple to operate.
Squeeze Plate quickly adjusted.
Low initial cost.

★

Write for NEW descriptive folders and Price Lists.

PIONEER
MANUFACTURING CO.
Molding Machine Manufacturer for Over 20 Years
MILWAUKEE (West Allis) WISC.

NEW TRADE PUBLICATIONS

SAND PREPARATION — Royer Foundry & Machine Co., Kingston, Pa., has available a 32-page bulletin No. 744 describing in technical detail the Royer line of sand conditioning equipment. The bulletin is lavishly illustrated with action photographs and drawings of the various models ranging from the portable Royer Jr. to the massive stationary model *R* capable of handling from 40 to 50 tons of sand per hour.

METALLIZING EQUIPMENT—Metallizing Co. of America, 1330 W. Congress St., Chicago 7, has published a new 14-page equipment catalog covering its various products for use in metallizing, metal spraying, sandblasting and casting repair welding.

ROTARY FILES—An attractive 6-page folder is offered by Grobet File Co. of America, 421 Canal St., New York 13. A supplement to its regular rotary file catalog, it contains a 4-page insert of profile drawings of different styles, and lists the various sizes of files permitted to be manufactured under WPB regulations.

CONTROL INSTRUMENTS—Wheelco Instruments Co., Chicago 7, has isued four bulletins describing improved control instrument devices. J303-2 describes an appliance controlling current supply, to replace the standard rheostat; J402-2 covers a manual type, and J403-2, an automatic type, timing device; J602-2 describes a simplified valve positioning device.

PYROMETERS—Bulletin No. 3511-B, issued by Illinois Testing Laboratories Inc., 420 North La Salle St., Chicago 10, describes a portable contact pyrometer for quick, accurate temperature readings of flat or curved, moving or stationary surfaces.

MATERIAL HANDLING—A new 40-page catalog, No. 7-11, is available through Mercury Mfg. Co., 4036 South Halsted St., Chicago 9, and includes description and specifications on tractors and trailers, platform trucks, fork lift trucks, and a fork truck-trackless train system. Appended are WPB regulations governing purchases of industrial trucks and tractors and forms to be filed in purchasing.

CONVEYORS—Lamson Corp., Syracuse 1, N. Y., offers a 24-page folder entitled "Case Histories to Aid You in Blueprinting Conversion to Peace," describing results that may be accomplished in reconversion to peace-time operations through the use of conveyors.

HEAT EXCHANGERS—Catalog Section M-8802, a new booklet published by National Carbon Co. Inc., 30 E. 42nd St., New York 17, sets forth charts and tables covering heat conductivity and physical and chemical properties of carbon, graphite and karbate materials, with illustrations indicating the versatility of these materials in the design and execution of a variety of heating and cooling units.

BEARING LUBRICATION — Farval Corp., 3248 E. 80th St., Cleveland 4, offers an attractive 4-page folder covering means of eliminating hazards due to manual lubrication of high-up and hard-to-get-at bearings on presses, cranes and other "off the floor" types of equipment by sending lubricants under pressure from a central unit to machine bearings.

SAWING MACHINES — Continental Machines Inc., Minneapolis 4, has for distribution a 4-page bulletin giving specifications and high operating speeds of a new high speed friction cutting machine designed to cut plastics, fabricated ply woods, light aircraft alloys, sheet metal and other metallic and nonmetallic materials.

AIR WASHERS—J. O. Ross Engineering Corp., 350 Madison Ave., New York 17, has just published bulletin No. 205, which describes its Air Scrubber designed not only to clean air but also for use in humidifying, dehumidifying, cooling, and fume elimination.

PUMPS—Chain Belt Co., Milwaukee 44, offers bulletin 447, a 20-page booklet describing available models of its self-priming centrifugal pumps.

REFRACTORIES—A 4-page pamphlet describing its refractory designed to make quick repairs of deep bottom holes in basic open-hearth furnaces is available through Basic Refractories Inc., Cleveland 15.

QUENCHER—Factors involved in the proper quenching of heat-treated metals are co-ordinated in a small quenching system offered by Bell & Gossett Co., Morton Grove, Ill., described in Catalog JC-744.

MEEHANITE CASTINGS—A 4-page bulletin, No. 20, has been published by Meehanite Research Institute of America Inc., Pershing Square Bldg., New Rochelle, N. Y., describing various types of meehanite castings manufactured for wear resisting applications.

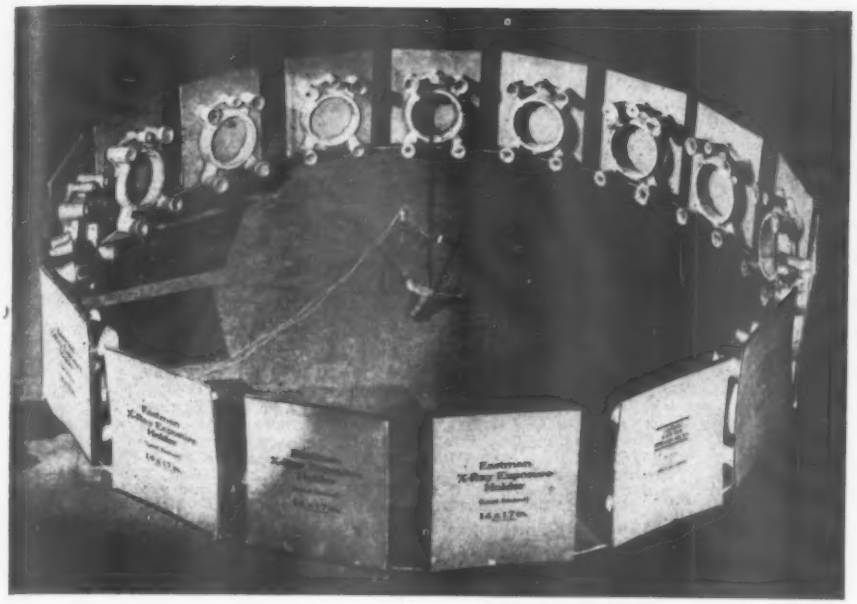
PYROMETERS—A new 12-page bulletin, No. P1202, with information on the application, operation and design of radiation pyrometers, has been published by the Bristol Co., Waterbury 91, Conn. Information regarding ranges, mountings, and accessories is included.

HEAT RESISTANT COATINGS—Copies of Bulletin No. 925, on two protective coatings embodying the principle of heat reflectance, are offered by Preferred Utilities Mfg. Corp., 1880 Broadway, New York 23. The coatings are used to protect refractories, metals, ceramics, etc.

OPTICAL PYROMETER—A 16-page catalog, N-33D, recently reprinted with minor changes, is offered by Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia 44, covering description of a potentiometer-type instrument for precision readings of temperature measurements in a few seconds.

METALLIZING PROCESSES—A new folder, bulletin 45, published by Metallizing Engineering Co. Inc., 38-14 30th St., Long Island 1, N. Y., describes three new processes said to increase service life of ordinary iron and steel heat treating equipment against corrosive action of sulphur and other gases.

RADIUM RADIOGRAPHY *Performs a* NEW FUNCTION



PHOTOGRAPH COURTESY OF CRANE CO.

"Directional solidification" can easily be studied by the set-up illustrated in the photograph—to indicate the best method of casting with a minimum of defects in the casting itself.

Radium has become a new foundry tool which directly effects an increase in yield. It permits accurate determination of the proper procedure in gating and risering "tough" castings. Seventeen cylindrical castings were radiographed simultaneously by Crane Co. to ascertain the most productive and economical foundry practice.

Radium thus performs a valuable additional function.

For inspection, for determination of directional solidification, Radium is available in capsules of various unit strength in duralumin holders which may be leased or purchased at low rates.

The rental includes full coverage insurance, heavy lead storage containers and slide rule exposure calculators.

Write us concerning any problem of Gamma Ray Radiography

RADIUM CHEMICAL COMPANY, INC. • 570 Lexington Ave., New York (22), N. Y. • Chicago: Marshall Field Annex Bldg.

...PENNSYLVANIA...

SEE US FIRST

Say Good-by to "leakers" with

SURNIT MULTI-V-RING CHAPLETS

Available in either single or double head

Multi-oversize V-Rings around the stem induces perfect fusing. Thin heads reduce casting marks and machining. Tinned to prevent rust. Made of low carbon, quick fusible metal.

MADE IN ALL LENGTHS, STEM DIAMETERS AND ROUND OR SQUARE HEAD SIZES

PENNSYLVANIA FOUNDRY SUPPLY & SAND Co.

ASHLAND and E. LEWIS STREETS — PHILADELPHIA, PA. — TELEPHONE, JEFFERSON 1012

WHERE-TO-BUY

The following classified list of advertisers according to products is conducted for the convenience of our readers in quickly locating sources of all types of foundry equipment and supplies. If you are seeking information on any product not listed in this directory, a letter or post card addressed to THE FOUNDRY, Penton Building, Cleveland, will bring you this information by return mail.

ABRASIVE (Bricks and Files)
Abrasive Co., Div. of Simonds Saw & Steel Co., Tacony & Fraley Sts., Philadelphia 37, Pa.
Bay State Abrasive Products Co., Westboro, Mass.
Bridgeport Safety Emery Wheel Co. Inc., Bridgeport, Conn.
Carborundum Co., Niagara Falls, N. Y.
Chicago Wheel & Mfg. Co., Dept. FD, 1101 W. Monroe, Chicago 7, Ill.
Cortland Grinding Wheels Corp., Chester, Mass.
Detroit-Star Grinding Wheel Co., 111 Cavalry Ave., Detroit, Mich.
Macklin Co., Jackson, Mich.
Norton Co., Worcester 6, Mass.
Peninsular Grinding Wheel Co., 729 Meldrum Ave., Detroit, Mich.
Safety Grinding Wheel & Mach. Co., Springfield, O.
Simonds Worden White Co., Dayton 7, O.
Sterling Grinding Wheel Co., Tiffin, O.

ABRASIVE CLOTH and PAPER
Behr-Manning Div. of Norton Co., Worcester 6, Mass.
Carborundum Co., Niagara Falls, N. Y.

ABRASIVE DISCS
Detroit-Star Grinding Wheel Co., 111 Cavalry Ave., Detroit, Mich.
Skilsaw Inc., 5035 N. Elston, Chicago 30, Ill.

ABRASIVE (Metallic)—See SHOT and GRIT

ABRASIVE WHEELS
Abrasive Co., Div. of Simonds Saw & Steel Co., Tacony & Fraley Sts., Philadelphia 37, Pa.
Bay State Abrasive Products Co., Westboro, Mass.
Bridgeport Safety Emery Wheel Co. Inc., Bridgeport, Conn.
Carborundum Co., Niagara Falls, N. Y.
Chicago Wheel & Mfg. Co., Dept. FD, 1101 W. Monroe, Chicago 7, Ill.
Cortland Grinding Wheels Corp., Chester, Mass.
Detroit-Star Grinding Wheel Co., 111 Cavalry Ave., Detroit, Mich.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Macklin Company, Jackson, Mich.
Manhattan Rubber Mfg. Div. of Raybestos, Manhattan, Inc., 77 Townsend St., Passaic, N. J.
Norton Company, Worcester 6, Mass.
Peninsular Grinding Wheel Co., 729 Meldrum Ave., Detroit, Mich.
Safety Grinding Wheel & Mach. Co., Springfield, O.
Simonds Worden White Co., Dayton 7, O.
Sterling Grinding Wheel Co., Tiffin, O.
West Co., Inc., 1117 Shackamaxon St., Philadelphia 25, Pa.

ABRASIVE CUTOFF MACHINES
Clipper Mfg. Co., 4030 Manchester, St. Louis, Mo.
De Walt Products Corp., Lancaster, Pa.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.
Tannewitz Works, Grand Rapids 4, Mich.

ACETYLENE GENERATORS
Sight Feed Generator Co., Richmond, Ind.

AFTERCOOLERS (Compressed Air)
Johnson Corporation, Three Rivers, Mich.

AIR COMPRESSORS
Campbell-Hausfeld Co., Harrison, O.
Chicago Pneumatic Tool Co., General Offices: 8 East 44th St., New York 17.
Curtis Pneumatic Machinery Co., 1922 Kienlen Ave., St. Louis 20, Mo.
Fuller Company, Catasaqua, Pa.
Gardner-Denver Co., Gardner Drive, Quincy, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.

AIR COMPRESSORS (Cont'd.)
Schramm Inc., 800 N. Garfield Ave., West Chester, Pa.
Worthington Pump & Machy. Corp., Harrison, N. J.

AIR CONDITIONING EQUIPMENT
American Air Filter Co., Inc., 266 Central Ave., Louisville 8, Ky.
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Curtis Pneumatic Machinery Co., 1922 Kienlen Ave., St. Louis 20, Mo.
Kirk & Blum Mfg. Co., 2838 Spring Grove Ave., Cincinnati 25, O.
Ross, J. O., Engineering Corp., 350 Madison Ave., New York 17.
Schneible Co., Claude B., 2827—25th St., Detroit 16, Mich.
Sturtevant, B. F., Co., Hyde Park, Boston, Mass.

AIR CONTROL EQUIPMENT
Air-Way Pump & Equipment Co., 405 S. Jefferson St., Chicago 7, Ill.
American Air Filter Co., 266 Central Ave., Louisville 8, Ky.
Foxboro Company, Foxboro, Mass.
Kirk & Blum Mfg. Co., 2838 Spring Grove Ave., Cincinnati 25, O.
Murphy, Jas. A., & Co., Hamilton, Ohio.
Ross, J. O., Engineering Corp., 350 Madison Ave., New York 17.
Schrader's Son, A., 470 Vanderbilt Ave., Brooklyn 17, N. Y.

AIR COUPLERS
Schrader's Son, A., 470 Vanderbilt Ave., Brooklyn 17, N. Y.

AIRLESS BLAST CLEANING EQUIPMENT
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Pangborn Corp., Hagerstown, Md.
Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O.

ALLOYS
Ajax Metal Co., 46 Richmond St., Philadelphia 23, Pa.
American-British Chemical Inc., 180 Madison Ave., New York 16.
American Smelting & Refining Co., 120 Broadway, New York 5.
Climax Molybdenum Co., 500 Fifth Ave., New York 18, N. Y.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Globe Iron Co., Jackson, Ohio.
International Nickel Co. Inc., 67 Wall St., New York City 5.
Molybdenum Corporation of America, Pittsburgh 19, Pa.
National Smelting Co., Cleveland, Ohio.
Niagara Falls Smelting & Refining Corp., 2204 Elmwood Ave., Buffalo 17, N. Y.
Ohio Ferro-Alloys Corp., Canton 2, O.

ALLOYS (Ferro)
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York 17, N. Y.
Hickman-Williams & Co., Union Trust Bldg., Cleveland 14, O.

ALUMINUM and ALUMINUM ALLOYS
Aluminum & Magnesium Inc., Sandusky, O.
Ajax Metal Co., 46 Richmond St., Philadelphia 23, Pa.
Apex Smelting Co., Chicago 12, Ill.
Cleveland Electro Metals Co., Cleveland 13, O.
Federated Metals Div., American Smelting & Ref. Co., New York City 5.
General Smelting Co., Philadelphia, Pa.
Jobbins, Wm. F., Inc., Aurora, Ill.
Lavin & Sons, R., Inc., Chicago, Ill.
National Smelting Co., Cleveland, O.
Niagara Falls Smelting & Refining Corp., 2204 Elmwood Ave., Buffalo 17, New York.
Sonken-Galamba Corp., Kansas City, Kans.
U. S. Metals Refining Co., New York.
U. S. Reduction Co., E. Chicago, Ind.

ALUMINUM INGOTS
Bohn Aluminum & Brass Corp., 1400 Lafayette Bldg., Detroit 26, Mich.

ALUMINUM INGOTS (Cont'd.)
Cleveland Electro Metals Co., West 38th St. & NP R.R., Cleveland 13, O.
Greenfield Co., Inc., Samuel, 31 Stone St., Buffalo, N. Y.
National Smelting Co., Cleveland, Ohio.
Niagara Falls Smelting & Refining Corp., 2204 Elmwood Ave., Buffalo 17, New York.

ANNEALING FURNACES (Electric)
General Electric Co., Schenectady, N. Y.

ANNEALING POT RAPPERS
New Haven Vibrator Co., 131 Chestnut St., New Haven 7, Conn.

APPRAISALS & SURVEYS
Giele, Walter, Co., First National Bank Bldg., Lebanon, Pa.

AREATORS
Bartlett & Snow, C. O., Co., 6201 Harvard Ave., Cleveland 5, O.

ARRESTORS (Dust)
American Foundry Equipment Co., 505 Byrkit St., Mishawaka, Ind.
Kirk & Blum Mfg. Co., 2838 Spring Grove Ave., Cincinnati 25, O.
Pangborn Corp., Hagerstown, Md.
Parsons Engineering Corp., Cleveland 4, O.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

ASSOCIATIONS
Aluminum Research Institute, Chicago 12, Ill.
Crucible Manufacturers Association, 90 West St., New York 6, N. Y.

BADGES (Identification)
St. Louis Button Co., 415 Lucas Ave., St. Louis 2, Mo.

BANDS (Snap Flask)
Adams Co., 700 Foster St., Dubuque, Ia.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.

BAND SAWS (High Speed)
Tannewitz Works, Grand Rapids 4, Mich.

BAND SAWS (Variable Speed)
Tannewitz Works, Grand Rapids 4, Mich.

BARS (Steel)
Bethlehem Steel Co., Bethlehem, Pa.
Republic Steel Corp., Cleveland 4, O.

BATTERIES (Industrial)
Philco Storage Battery Div., Philco Corporation, Trenton, N. J.

BEARINGS (Anti-Friction, Roller and Ball)
Link Belt Co., 519 N. Holmes Ave., Indianapolis, Ind.
Logan Company, 580 Cabel, Louisville, Ky.

BELTING (Conveyor, Elevator)
Imperial Belting Co., 1800 So. Kilbourn Ave., Chicago 23, Ill.

BELTS (Power Transmission)
Imperial Belting Co., 1800 So. Kilbourn Ave., Chicago 23, Ill.

BENTONITE
American Colloid Co., 363 W. Superior St., Chicago 10, Ill.
Eastern Clay Products, Inc., Eifort, O.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Great Lakes Foundry Sand Co., United Artists Bldg., Detroit 26, Mich.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis St., Philadelphia 24, Pa.
Schundler, F. E., & Co. Inc., 520 Railroad Ave., Joliet, Ill.

BINS (Storage)
American Bridge Co., Pittsburgh 19, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Neff & Fry, Camden, O.

BLACKING (Mold, Core)
Bloomsbury Graphite Co., Bloomsbury, N. J.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Stevens, Frederic B., Inc., Detroit 26, Mich.

BLACKING (Mold, Core) (Cont'd.)
J. S. McCormick Co., 25th St. & A. V. R. R., Pittsburgh 22, Pa.
United States Graphite Co., Saginaw, Mich.

BLASTING EQUIPMENT
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
American Steel Abrasives Co., Galion, O.
Hydro-Blast Corp., 2550 N. Western Ave., Chicago 47, Ill.
Pangborn Corp., Hagerstown, Md.
Parsons Engineering Corp., Cleveland 4, O.
Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O.

BLAST METERS
Foxboro Company, Foxboro, Mass.

BLOWERS
American Air Filter Co., 266 Central Ave., Louisville 8, Ky.
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Campbell-Hausfeld Co., Harrison, O.
Fisher Furnace Co., 5535 N. Wolcott Ave., Chicago 40, Ill.
General Blower Co., 406 N. Peoria St., Chicago 22, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Johnston Mfg. Co., Minneapolis 13, Minn.
Mahr Mfg. Co., Div. of Diamond Iron Works, Minneapolis, Minn.
North American Mfg. Co., 2910 E. 75th St., Cleveland 4, O.
Roots-Connersville Blower Corp., 302 Madison Ave., Connersville, Ind.
Stroman Furnace & Engineering Co., Div. of Peterson Oven Co., 300 W. Adams St., Chicago 6, Ill.
B. F. Sturtevant Co., Hyde Park, Boston, Mass.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

BOLTS AND NUTS
American Bridge Co., Frick Bldg. Pittsburgh 19, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Republic Steel Corp., Cleveland 4, O.

BOND CLAY
American Colloid Co., 363 W. Superior St., Chicago 10, Ill.
Eastern Clay Products Inc., Eifort, O.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Great Lakes Foundry Sand Co., United Artists Bldg., Detroit 26, Mich.
Ironton Fire Brick Co., Ironton, O.
Minco Products Corp., aginaw, Mich.
Schundler & Co. Inc., F. E. 520 Railroad Ave., Joliet, Ill.

BOOKS (Technical)
Penton Publishing Co., 1213 West 3rd St., Cleveland 13, O.

BOTTOM PLATES AND BOARDS
Adams Co., 700 Foster St., Dubuque, Iowa.
Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.
Dougherty Lumber Co., 4300 East 68th St., Cleveland 5, O.
Moltrup Steel Products, Beaver Falls, Pa.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.
Truscon Steel Co., Youngstown 1, O.

BOWLS and SHANKS
Industrial Equipment Co., Minster, O.

BOXES (Tote)
Penn Iron Works, Reading Pa.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

BRAKES (Magnetic)
Stearns Magnetic Mfg. Co., 662 S. 28th St., Milwaukee 4, Wis.

BRICK (Carbon and Graphite)
National Carbon Co. Inc., Carbon Products Div., Cleveland 1, O.

BRICK (Refractory)
Carborundum Co., Niagara Falls, N. Y.

—When writing advertisers, please mention THE FOUNDRY—

THERE'S A POINT IN *Saving* THIS YEAR

Reclaiming Core Wire—Large Eastern Foundry

DURING the past 35 years hundreds of foundries bought and used Climax Wire Straighteners. These foundries considered it good business practice to economize by re-using core wires and rods.

Cutting costs *was* good business—and still is, but there's an even better reason for using a Climax now.

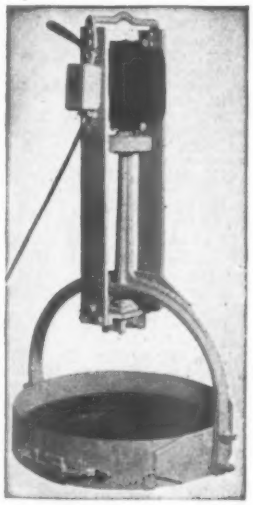
Every pound of wire and rod that is re-used is a pound of steel saved—every pound of steel saved is a contribution to our victory over the Axis!

You will find no better means of straightening core wires than with the Climax Wire Straightener.

One of the three Climax models will usually straighten all the various sizes you use. The Climax straightens wires and rods quickly, safely and economically and does not require experienced help for its operation.

We have prepared a new circular which describes and illustrates all three models of the Climax Wire Straightener. It's yours for the asking—why not write for it now?

THE LOWE ELECTRIC SIFTER



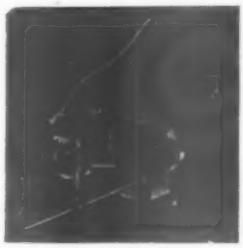
● An old friend with a new "zip." Faster sifting than ever before due to the new-design malleable yoke.

Easier loading for there's more clearance above the screen surface.

All wearing parts are easily replaceable —the Lowe is never long out of service.

Totally enclosed ball bearing motor ensures long unfailing service at low cost.

You'll get better castings when you screen your sand with a Lowe Electric Sifter.



Have you tried a Wonder Cutter? You can't beat it for cutting rods, wires or small band iron. It's inexpensive too.

FEDERAL TWISTED STEM CHAPLETS

● The ideal foundry chaplet because:

Uniform stem strength from head to head—no weakening deformations to permit collapse and failure.

Perfect fusion —every time results from four sharp fusion edges the entire stem length.

The smooth stem will not collect gas-causing dirt and offers no pockets to trap gas.

"The Twist Does The Trick"

THE FEDERAL FOUNDRY SUPPLY CO.

4600 EAST 71st STREET, CLEVELAND, OHIO

CHICAGO — CHATTANOOGA, TENN. — CROWN HILL, W. VA. — DETROIT — MILWAUKEE
MINNEAPOLIS — NEW YORK — RICHMOND, VA. — ST. LOUIS — UPTON, WYO.

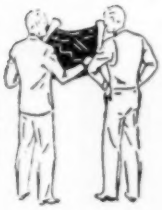
Chamberlain Co., Los Angeles, Calif.—Pacific Graphite Wks., Oakland, Calif.—LaGrand Industrial Supply Co., Portland, Ore.—Shanahan's Ltd., Vancouver, B. C.

WHERE LOST SECONDS Could Spoil a Pour

ALVEY-FERGUSON

Conveyor Systems

Increase Quality Production



BY means of an advanced method of pouring from ladles supported by light, overhead monorail tracks located directly above A-F Roller Conveyors, vital seconds are saved in this small but efficient foundry.

This is just one of the efficient techniques developed by A-F Conveyor Engineers that helped to boost the quality output of The Schaible Co. as much as 40%.

If you would like to learn how *your* entire plant can be made more efficient by means of a complete A-F Endless Stream Sand Handling and Indoor Transportation System, write, without obligation on your part, for a discussion—today.

THE ALVEY-FERGUSON COMPANY
994 DISNEY ST., CINCINNATI 9, OHIO
Offices in Principal Cities
Affiliated Corporation:
THE ALVEY-FERGUSON COMPANY OF CALIFORNIA
P. O. BOX 396, VERNON BRANCH, LOS ANGELES 11, CAL.

CONVEYING EQUIPMENT
Alvey-Ferguson
METAL PRODUCTS CLEANING & FINISHING EQUIPMENT

WHERE-TO-BUY

BRICK (Refractory) (Cont'd.)
Firegan Sales Co., 1691 Board of Trade Bldg., Chicago, Ill.
Ironton Fire Brick Co., Ironton, O.
Norton Co., Worcester 6, Mass.
Titanium Alloy Mfg. Co., Niagara Falls, N. Y.

BRIQUETS (Alloy)
Climax Molybdenum Co., 500 Fifth Ave., New York 18, N. Y.
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York 17, N. Y.

BRIQUETS (Ferro Alloy)
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York 17, N. Y.

BRIQUETS (Silicon Carbide)
Carborundum Co., Niagara Falls, N. Y.

BRIQUETTING MACHINERY (Metal)
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee 4, Wis.

BRUSHES
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.

BRUSHES (Motor & Generator)
National Carbon Co. Inc., Carbon Products Div., Cleveland 1, O.

BUCKETS (Elevating, Clam Shell, Drag Line, Grab, Loader, Dumping)
Blaw-Knox Co., Farmers Bank Bldg., Pittsburgh, Pa.
Erie Steel Construction Co., Erie, Pa.
Link Belt Speeder Corp., 307 N. Michigan Ave., Chicago, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Penn Iron Works, Reading, Pa.
Wellman Engineering Co., 7000 Central Ave., Cleveland 4, O.

BUILDING and ENGINEERING SERVICE
American Bridge Co., Pittsburgh 19, Pa.

BURNERS (Acetylene, Oil, Gas, Powdered Coal, Stoker)
Fisher Furnace Co., 5535 N. Wolcott Ave., Chicago 40, Ill.
Hauck Mfg. Co., 106 Tenth St., Brooklyn 15, N. Y.
Johnston Mfg. Co., Minneapolis 13, Minn.
Liquid Carbonic Corp., 3110 S. Kedzie Ave., Chicago 23, Ill.
North American Mfg. Co., 2910 E. 75th St., Cleveland 4, O.
W. S. Rockwell Co., 56 Church St., New York 7, N. Y.
Surface Combustion Co., Toledo, O.

BUSHINGS (Flask-Pin)
Hines Mfg. Co., 1324 Hird Ave., Cleveland 7, O.
C. M. Smillie & Co., 1100 Woodward Hgts. Blvd., Ferndale, Mich.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.

BUSHINGS (Hammer)
Steel Conversion & Supply Co., Library Road, Castle Shannon, Pittsburgh, Pa.

CALCIUM MOLYBDATE
Climax Molybdenum Co., 500 Fifth Ave., New York 18, N. Y.
Molybdenum Corporation of America, Pittsburgh 19, Pa.

CALCIUM BORIDE
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Molybdenum Corporation of America, Pittsburgh 19, Pa.

CASSETTES (X-Ray Film)
Picker X-Ray Corp., 300 Fourth Ave., New York City 10.

CASTINGS
Acme Pattern & Tool Co., Inc., 232 N. Findlay St., Dayton 3, O.
City Pattern Foundry & Machine Co., 1165 Harper Ave., Detroit 11, Mich.

CASTING MACHINES (Centrifugal)
Centrifugal Casting Mach. Co., Tulsa, Okla.

CASTING PLASTER
National Gypsum Co., Buffalo 2, N. Y.
United States Gypsum Co., 300 W. Adams St., Chicago, Ill.

CEMENT (Metallic)
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Frederic B. Stevens, Inc., Detroit 26, Mich.
Smooth-On Manufacturing Co., 570 Communipaw Ave., Jersey City 4, N. J.

CEMENT (Refractory)
Bay State Abrasive Products Co., Westboro, Mass.
Carborundum Co., Niagara Falls, N. Y.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Firegan Sales Co., 1691 Board of Trade Bldg., Chicago, Ill.
Fisher Furnace Co., 5535 N. Wolcott Ave., Chicago 40, Ill.
Ironton Fire Brick Co., Ironton, O.
Norton Co., Worcester 6, Mass.
Titanium Alloy Mfg. Co., Niagara Falls, N. Y.

CHAIN (Hoist, Conveyor, Drive, Sling, etc.)
American Chain Div., American Chain & Cable Co., 230 Park Ave., New York.
Jeffrey Mfg. Co., 907-99 N. Fourth Ave., New York City 10.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.

CHAIN (Welded and Weldless)
American Chain Div., American Chain & Cable Co., 230 Park Ave., New York.

CHAPLETS
Cleveland Chaplet & Mfg. Co., 1197 West 67th St., Cleveland 2, O.
Combined Supply & Equipment Co. Inc., 215 Chandler St., Buffalo 7, N. Y.
Fanner Mfg. Co., Brookside Park, Cleveland 2, O.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Freeman Supply Co., 1152 Broadway, Toledo 5, O.
Milwaukee Chaplet & Mfg. Co., 1023 S. 40th St., Milwaukee 4, Wis.
One Piece Chaplet Co., 4001 Ashland, Philadelphia, Pa.
Smith & Richardson Mfg. Co., Geneva, Ill.
Frederic B. Stevens, Inc., Detroit 26, Mich.

CHARCOAL
McDonald Charcoal Co., Argyle, Mo.

CHEMICALS
American-British Chemical Inc., 180 Madison Ave., 16, New York
Ansul Chemical Co., Marinette, Wis.
General Chemical Co., 40 Rector St., New York 6, N. Y.
Hercules Powder Co., 999 Market St., Wilmington 99, Del.
The Mathieson Alkali Works, Inc., 60 E. 42nd St., New York 17, N.Y.

CHEMISTS
Chas. C. Kawin Co., 431 So. Dearborn St., Chicago 5, Ill.

CHILLS
Alloy Metal Abrasive Co., 311 W. Huron St., Ann Arbor, Mich.
Chicago Chaplet Co., 2047 N. Wood St., Chicago, Ill.
Fanner Mfg. Co., Brookside Park, Cleveland 2, O.
Milwaukee Chaplet & Mfg. Co., 1023 So. 40th St., Milwaukee 4, Wis.
Smith & Richardson Mfg. Co., Geneva, Ill.
Standard Horse Nail Corp., New Brighton, Pa.

CHILL COATINGS
Dayton Oil Co., Dayton 1, O.

CHILL NAILS
Capewell Mfg. Co., Hartford, Conn.
Standard Horse Nail Corp., New Brighton, Pa.

CHILL OILS
Certified Core Oil & Mfg. Co., 3308 So. Cicero Ave., Chicago 50, Ill.

CHISELS (Chipping)
Master Tool Co, Inc., 5605 Herman Ave., Cleveland 2, O.
Steel Conversion & Supply Co., Library Road, Castle Shannon, Pittsburgh, Pa.

CHIPPERS—See PNEUMATIC TOOLS

CHILL COILS
Fanner Mfg. Co., Brookside Park, Cleveland 2, O.
J. S. McCormick Co., 25th St. & A.V. R. R. Pittsburgh 22, Pa.

CHROMIUM (Briquets)
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York 17, N. Y.

CLAMPS (Flask)
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.

—*When writing advertisers, please mention* THE FOUNDRY—

EXCELLO

Mold and Core Wash

MOST FAMOUS NAME IN ALL

The Foundry Facing Field

GUARANTEES CLEAN CASTINGS

For Sixty-Two Years Bloomsbury Quality Products Have Served and Satisfied the Leading Foundries from Coast to Coast. Direct from our Mills to your Foundry—Demonstration Sample Free.

BLOOMSBURY GRAPHITE COMPANY SINCE 1882 **BLOOMSBURY, N. J.**

MELTING POTS—Ingot Molds

for Aluminum and Other Non-Ferrous Metals

Catalogue on Request—45 Sizes *They stand the heat.*

ACME SPECIAL-M-HEAT RESISTING IRON

ACME FOUNDRY COMPANY

DETROIT 16, MICHIGAN

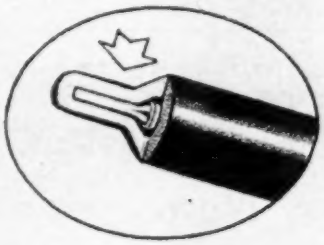
2502 TWENTY-SECOND ST. PHONE LAFAYETTE 2404

"We Get Quick Accuracy

....with this Marshall Tool!

"THE Marshall Enclosed-Tip Thermocouple has solved our 'slag nuisance' problem. We find slag can't hurt the hot-junction point of this thermocouple like it does the open-type-wire kinds. It gives us quick, sure temperature reading every time, and no trouble. We're producing sounder castings now and far fewer have to go to the scrap pile."—*Michigan Foundry Superintendent*

The cut-away section view here shows the thermocouple wires swaged into the encasing tip, and also insulated from all contact with the tube throughout its entire length.



Critical war days are no time to put up with costly miss-runs in the foundry! By giving you dependable temperature control, the Marshall Enclosed-Tip Thermocouple eliminates these expensive losses.

The Marshall instrument is of engineered design, built to take temperature *within* the melt. There can be no circuit trouble because the couple wires are entirely protected from contact with the metal.

Its readings are instant and exact. It stands immersions repeatedly in brass, bronze, aluminum and magnesium.

L. H. MARSHALL CO.
270 W. Lane Ave.
COLUMBUS 1, OHIO

Write for this descriptive Folder, or see the pyrometer manufacturer you patronize.

WHERE-TO-BUY

CLAMPS (Flask) (Cont'd.)
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.
Truscon Steel Co., Youngstown 1, O.

CLAY (Bonding)
American Colloid Co., 363 W. Superior St., Chicago 10, Ill
Eastern Clay Products, Inc., Elfort, O.
The Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Illinois Clay Products Co., Joliet, Ill.
Ironton Fire Brick Co., Ironton, O.
Minco Products Corp., Saginaw, Mich.
F. E. Schundler & Co. Inc., 520 Railroad Ave., Joliet, Ill.

CLAY STORAGE BINS
Neff & Fry, Camden, O.

CLEANING COMPOUNDS (Core boxes etc.)
Houghton Co., E. F. Philadelphia, Pa.

CLEANING COMPOUNDS (Window etc.)
Hercules Powder Co., 999 Market St., Wilmington 99, Del.

CLEANING EQUIPMENT (Castings)
Alvey-Ferguson Co., 75 Disney St., Cincinnati 9, Ohio.
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
N. Ransonoff Inc., 208 W. 71st St., Cincinnati 16, O.
Whiting Corporation 15607 Lathrop Ave., Harvey, Ill.

CLUTCHES (Magnetic)
Stearns Magnetic Mfg. Co., 622 S. 28th St., Milwaukee 4, Wis.
Dings Magnetic Separator Co., 512 E. Smith St., Milwaukee 7, Wis.

COAL STORAGE BINS
Neff & Fry, Camden, O.

COKE (Foundry)
DeBardeleben Coal Corp., 2201 First Ave., N., Birmingham 3, Ala.
Hickman-Williams & Co., Cleveland 14, O.
Pickands, Mather & Co., Cleveland 14, O.
Republic Coal & Coke Co., 8 So. Michigan Ave., Chicago 3, Ill.

COLLECTORS (Dust)
American Air Filter Co., 266 Central Ave., Louisville 8, Ky.
American Foundry Equipment Co., 505 S. Byrkit St., Misnawaka, Ind.
Buell Engineering Co., 14 Cedar St., New York City 5.
Kirk & Blum Mfg. Co., 2838 Spring Grove Ave., Cincinnati 25, O.
R. C. Mahon Co., 8650 Mt. Elliot Ave., Detroit 11, Mich.
Pangborn Corp., Hagerstown, Md.
Parsons Engineering Corp., Cleveland 4, O.
Peters-Dalton Inc., 628 E. Forest Ave., Detroit 1, Mich.
Schneible Co., Claude B., 2827—25th St., Detroit 16, Mich.
Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

COMBUSTION EQUIPMENT
North American Mfg. Co., 2910 E. 75th St., Cleveland 4, O

CONCRETE STORAGE BINS
Neff & Fry Co., Camden, O.

CONTROL SYSTEMS (Dust)
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
American Air Filter Co., 223 Central Ave., Louisville, Ky.
Buell Engineering Co., 14 Cedar St., New York City 5.
Pangborn Corp., Hagerstown, Md.
Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

CONVERTERS (Bessemer)
Whiting Corporation 15607 Lathrop Ave., Harvey, Ill.

CONVERTER BLOWERS
Roots-Connersville Blower Corp., 302 Madison Ave., Connersville, Ind.

CONVEYORS (Belt)
Beardsley & Piper Co., The, 2541 N. Keeler Ave., Chicago 39, Ill.
Chain Belt Co., 1671 W. Bruce St., Milwaukee 4, Wis.
C. O. Bartlett & Snow Co., 6201 Harvard Ave., Cleveland 5, O.

CONVEYORS (Belt) (Cont'd.)
Imperial Belting Co., 1800 So. Kilbourn Ave., Chicago 23, Ill.
Jeffrey Mfg. Co., 907-99 N. Fourth St., Columbus 16, O.
Link Belt Co., 300 W. Pershing Rd. Chicago 9, Ill.
Mahr Mfg. Co., Div. of Diamond Iron Works, Minneapolis, Minn.
The Manhattan Rubber Mfg. Co. Passaic, N. J.
Robins Conveyors Inc. Passaic, N. J.
Standard Conveyor Co., North St. Paul 9, Minn.

CONVEYORS (Chain)
Chain Belt Co., 1671 W. Bruce St., Milwaukee 4, Wis.
Jeffrey Mfg. Co., 907-99 N. Fourth St., Columbus 16, O.
Link Belt Co., 300 W. Pershing Rd. Chicago 9, Ill.
Mathews Conveyer Co., 104 Tenth St., Ellwood City, Pa.
Standard Conveyor Co., North St. Paul 9, Minn.

CONVEYORS (Gravity)
Alvey-Ferguson Co., 75 Disney St., Cincinnati 9, Ohio.
Logan Company, 580 Cabel, Louisville, Ky.
Mathews Conveyer Co., 104 Tenth St., Ellwood City, Pa.
Standard Conveyor Co., North St. Paul 9, Minn.

CONVEYORS (Live Roller)
Alvey-Ferguson Co., 75 Disney St., Cincinnati 9, Ohio.
Logan Company, 580 Cabel, Louisville, Ky.
Standard Conveyor Co., North St. Paul 9, Minn.

CONVEYORS (Magnetic)
Stearns Magnetic Mfg. Co., 662 S. 28th St., Milwaukee 4, Wis.

CONVEYORS (Monorail)
American Monorail Co., 13104 Athens Ave., Cleveland 7, O.
Chicago Tramrail Co., 2910 Carroll Ave., Chicago 12, Ill.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co. 1155 East 283rd St., Wickliffe, O.
Link Belt Co., 300 W. Pershing Rd. Chicago 9, Ill.
Mathews Conveyer Co., 104 Tenth St., Ellwood City, Pa.
Penn Iron Works, Reading, Pa.

CONVEYORS (Overhead)
Alvey-Ferguson Co., 75 Disney St., Cincinnati 9, Ohio.

CONVEYORS (Pneumatic)
Fuller Company, Catasaqua, Pa.

CONVEYORS (Portable - Gas Electric)
Cleveland Formgrader Co., 6723 Denison Ave., Cleveland, Ohio.

CONVEYORS (Rubber)
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
Standard Conveyor Co., North St. Paul 9, Minn.

CONVEYORS (Vibrating)
Ajax Flexible Coupling Co., Westfield, N. Y.
Syntron Company, Homer City, Pa.

COPPER
American Smelting & Refining Co. 120 Broadway, New York 5.

COPPER SHOT
Alloy Metal Abrasive Co., 311 W. Huron St., Ann Arbor, Mich.
American Smelting & Refining Co. 120 Broadway, New York 5.
Niagara Falls Smelting & Refining Corp., 2204 Elmwood Ave., Buffalo 17, N. Y.
Silvertein & Pinsof Inc., 1729 N. Elston, Chicago 22, Ill.

CORE BINDERS
American Gum Products Co., 500 Fifth Ave., New York 18, N. Y.
Bondite Corporation, 844—150th St. Hammond, Indiana.
Bondite Corporation, 2325 East 38th St., Los Angeles 11, Calif.
Certified Core Oil & Mfg. Co., 3308 So. Cicero Ave., Chicago 50, Ill.
Cities Service Oil Co., 3200 S. Western Ave., Chicago 8, Ill.
Corn Products Sales Co., 17 Battery Pl., New York City 4.
Dayton Oil Co., Dayton 1, O.
Delta Oil Products Co., Milwaukee 9, Wis.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.

—When writing advertisers, please mention THE FOUNDRY—

Get Dependable Protection Against CORE BLOWING

BUFFALO BRAND
VENT WAX
MEDIUM
WAX FOR
Moderate Weather
NOTICE.
This wax is sensitive to extreme heat and cold.
If too soft, place in a pail of cold water before unwinding, or, if too hard, warm slightly.
ADVISE US OF ANY TROUBLE.
THANK YOU.

with

BUFFALO BRAND VENT WAX

For over thirty-five years, leading foundries have been meeting their most difficult core venting problems with dependable Buffalo Brand Vent Wax. You can't buy better, safer protection against core blowing and resultant casting losses than this low cost product.

There is a Right Buffalo Brand Vent Wax for Every Job

Buffalo Brand Vent Wax is available in two shapes and eighteen sizes to provide just the right size vent for any core.

Ask Your Supply Dealer
or Write for FREE SAMPLE

Buffalo Brand
VENT WAX

UNITED COMPOUND COMPANY
328 South Park Ave. Buffalo 4, N. Y.

CLARK FORK TRUCKS

FIVE REASONS FOR BUYING FORK TRUCKS BUILT BY...CLARK

1 Move materials faster.

2 Relieve congestion.

3 Multiply manpower.

4 Simplify Planning.

5 Save money.

Clark Tructractor builds industrial haulage vehicles for every material handling operation.

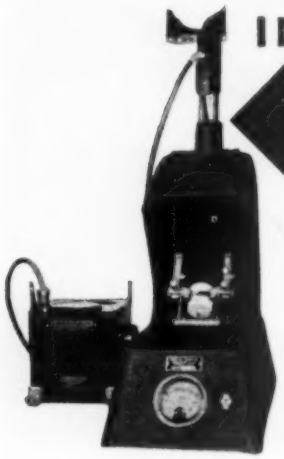
Another PRODUCT of CLARK EQUIPMENT COMPANY

Write for New Vest Pocket Catalog

CLARK TRUCTRACTOR
DIVISION OF CLARK EQUIPMENT COMPANY
BATTLE CREEK, MICHIGAN, U. S. A.

FOR *Greater* EFFICIENCY

USE *Dietert* INSTRUMENTS



SINTER METER

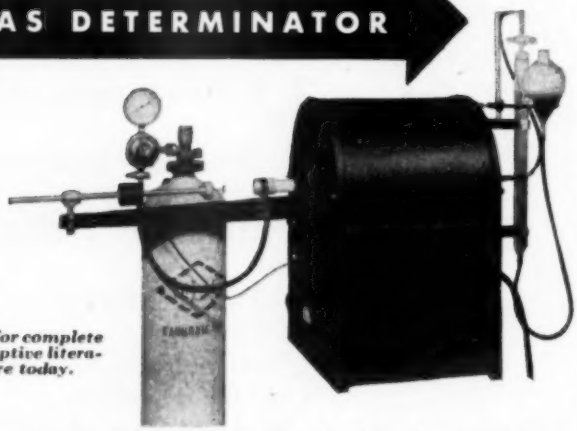
The refractoriness of foundry molding materials may be readily determined with the Sinter Meter. Controlling the refractoriness enables the foundryman to obtain a control on the amount of glazing on the mold surface thus producing cleaner castings.

CORE HARDNESS TESTER

Control core hardness to improve castings.

The surface hardness of baked cores and dry sand molds is easily measured with a Core Hardness Tester. This tester is convenient to carry and the test can be made within a few seconds.

GAS DETERMINATOR



Send for complete descriptive literature today.

The amount of gas in molding materials affects the surface finish of castings. Use the Gas Determinator to measure the amount of gas generated by a molding material at the temperature of molten metal in the mold.

CONTROL EQUIPMENT — SAVES TIME

Harry W. Dietert Co.

9330 ROSELAWN . . . DETROIT 4 MICH.

WHERE-TO-BUY

CORE BINDERS (Cont'd.)
Foundry Rubber Compounds Corp., 1050 Thirtieth St., N. W., Washington 7, D. C.
Hercules Powder Co., 999 Market St., Wilmington 99, Del.
Houghton Co., E. F., 303 West Lehigh Ave., Philadelphia 33, Pa.
International Paper Co., 220 E. 42nd S.., New York City 17.
J. S. McCormick Co., 25th St., & A.V. R. R., Pittsburgh 22, Pa.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis Sts., Philadelphia 24, Pa.
Penola Inc., Pittsburgh 1, Pa.
Robeson Process Co., 500 Fifth Ave., New York 18.
Werner G. Smith Co., (Div. of Archer-Daniels-Midland Co.), 2191 W. 110th St., Cleveland 2, O.
Frederic B. Stevens, Inc., Detroit 26, Mich.
United Oil Mfg. Co., 1429 Walnut St., Erie, Pa.
Velsicol Corp., 120 E. Pearson St., Chicago 11, Ill.

CORE BLOWING MACHINES
Champion Foundry & Machine Co., 1314 West 21st St., Chicago 8, Ill.
Wm. Demmler & Bros., Kewanee, Ill.
International Molding Machine Co., 2608 W. 16th St., Chicago 8, Ill.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.

CORE BREAKERS
Cleveland Pneumatic Tool Co., 3781 East 77th St., Cleveland 5, O.
Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago, Ill.

CORE COMPOUND
Bondite Corporation, 844—150th St., Hammond, Indiana.
Bondite Corporation, 2325 East 38th St., Los Angeles 11, Calif.
Certified Core Oil & Mfg. Co., 3308 So. Cicero Ave., Chicago 50, Ill.
Cities Service Oil Co., 3200 S. Western Ave., Chicago 8, Ill.
Dayton Oil Co., Dayton 1, O.
Delta Oil Products Co., Milwaukee 9, Wis.
The Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Foundry Rubber Compounds Corp., 1050 Thirtieth St., N. W., Washington 7, D. C.
Houghton Co., E. F., 303 West Lehigh Ave., Philadelphia 33, Pa.
International Paper Co., 220 E. 42nd St., New York City 17.
The Werner G. Smith Co., (Div. of Archer-Daniels-Midland Co.), 2191 W. 110th St., Cleveland 2, O.
J. S. McCormick Co., 25th St. & A. V. R.R., Pittsburgh 22, Pa.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis Sts., Philadelphia 24, Pa.
Penola Inc., Pittsburgh 1, Pa.
Smith Facing & Supply Co., 1857 Carter Rd., Cleveland 13, O.
Frederic B. Stevens, Inc., Detroit 26, Mich.
Velsicol Corp., 120 E. Pearson St., Chicago 11, Ill.
E. J. Woodison Co., 7515 St. Aubin Ave., Detroit 11, Mich.

CORE DRAWER
Freeman Supply Co., Toledo 5, O.

CORE GRINDERS (Power Operated)
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee 4, Wis.

CORE KNOCKOUT MACHINES
Beardsley & Piper Co., The, 2541 N. Keeler Ave., Chicago 39, Ill.
Hydro-Blast Corp., 2550 N. Western Ave., Chicago 47, Ill.
Pangborn Corp., Hagerstown, Md.
Simplicity Engineering Co., Durand, Mich.

CORE MAKING MACHINES
Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Davenport Machine & Foundry Co., Davenport, Iowa.
Wm. Demmler & Bros., Kewanee, Ill.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
International Molding Machine Co., 2608 W. 16th St., Chicago 8, Ill.
Milwaukee Foundry Equipment Co., 3228 W. Pierce St., Milwaukee 4, Wis.

CORE OIL
Buckeye Products Co., 7022 Vine St., Cincinnati 16, O.

CORE OIL (Cont'd.)
Certified Core Oil & Mfg. Co., 3308 So. Cicero Ave., Chicago 50, Ill.
Cities Service Oil Co., 3200 S. Western Ave., Chicago 8, Ill.
Dayton Oil Co., Dayton 1, O.
Delta Oil Products Co., Milwaukee 9, Wis.
Houghton Co., E. F., Philadelphia, Pa.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis Sts., Philadelphia 24, Pa.
Penola Inc., Pittsburgh 1, Pa.
Werner G. Smith Co., (Div. of Archer-Daniels-Midland Co.), 2191 W. 110th St., Cleveland 2, O.
Frederic B. Stevens, Inc., Detroit 26, Mich.
United Oil Mfg. Co., 1429 Walnut St., Erie, Pa.
Velsicol Corp., 120 E. Pearson St., Chicago 11, Ill.
Woodison, E. J., Co., 7515 St. Aubin Ave., Detroit 11, Mich.

CORE OVENS
Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, O.
Despatch Oven Co., Minneapolis 14, Minn.
Foundry Equipment Co., Cleveland 13, O.
Gehnrich Oven Div., W. S. Rockwell Co., 56 Church S.., New York 7, N. Y.
Grimes Molding Machine Co., 1429 Virginia Park, Detroit 6, Mich.
Kirk & Blum Mfg. Co., 2838 Spring Grove Ave., Cincinnati 25, O.
Lanly Company, 750 Prospect Ave., Cleveland 15, O.
Maehler, Paul, Co., 2200 W. Lake St., Chicago 12, Ill.
Mahon, R. C., Co., 6650 Mt. Elliott Ave., Detroit 11, Mich.
Mahr Mfg. Co., Div. of Diamond Iron Works, Minneapolis, Minn.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis S.s., Philadelphia 24, Pa.
Peters-Dalton Inc., 628 E. Forest Ave., Detroit 1, Mich.
Ross, J. O., Engineering Corp., 350 Madison Ave., New York 17.
Vulcan Corporation, 18 h & Cherry Sts., Philadelphia 3, Pa.
Young Brothers Co., 6508 Mack Ave., Detroit 7, Mich.

CORE PASTE
Corn Products Sales Co., 17 Battery Pl., New York City 4.
Dayton Oil Co., Dayton 1, O.
Delta Oil Products Co., Milwaukee 9, Wis.
Eastern Clay Products, Inc., Elfort, O.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
McCormick, J. S., Co., 25th St. & A. V. R.R., Pittsburgh 22, Pa.

CORE PLATES (Steel Asbestos)
Diamond Clamp & Flask Co., Richmond, Ind.
Johns-Manville, 22 East 40th St., New York City 16.
Moltrup Steel Products, Beaver Falls, Pa.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.
Truscon Steel Co., Youngstown 1, O.

CORE RODS
Bethlehem Steel Co., Bethlehem, Pa.

CORE RODS (Carbon, Graphite)
National Carbon Co. Inc., Carbon Products Div., Cleveland 1, O.

CORE ROD STRAIGHTENING and CUTTING MACHINERY
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.

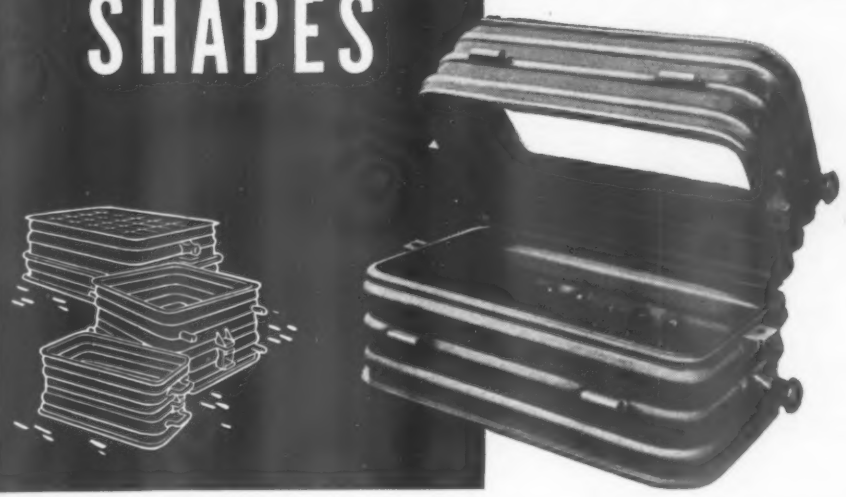
CORE SAND
Great Lakes Foundry Sand Co., United Artists Bldg., Detroit 26, Mich.
Nugent Sand Co., Muskegon, Mich.
Ottawa Silica Co., Ottawa, Ill.
Standard Silica Corp., 209 So. LaSalle St., Chicago 4, Ill.
Titanium Alloy Mfg. Co., Niagara Falls, N. Y.

CORE SAND MIXERS
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Beardsley & Piper Co., The, 2541 N. Keeler Ave., Chicago 39, Ill.
Clearfield Machine Co., Clearfield, Pa.
Construction Machinery Corp., Waterloo, Iowa.
Freeman Supply Co., 1152 E. Broadway, Toledo 5, O.
Grimes Molding Machine Co., 1420 Virginia Park, Detroit 6, Mich.

—When writing advertisers, please mention THE FOUNDRY—

One of the PROFIT FEATURES *of* TRUSCON FOUNDRY FLASKS

PROPER SIZES AND SHAPES



● Whatever your casting needs may be, Truscon can recommend exactly the right type of steel flask to assure efficient performance in heavy service.

Truscon Foundry Flasks are available in a wide range of shapes and sizes, designed in accordance with standards established by actual foundry requirements under a wide range of conditions. Their continued use and re-order by a large number of satisfied foundries is evidence of their satisfactory service.

Write for illustrated catalog giving Truscon Foundry Flask details that may help you increase foundry profits:

TRUSCON STEEL CO.
Pressed Steel Division
6100 Truscon Avenue
CLEVELAND, OHIO
Subsidiary of Republic Steel Corporation

Correct thickness of flask walls . . . proper placing of flanges . . . types of handles and pin lugs . . . these and other Truscon features assure quick, economical, long-life production in your plant.

ARMY E NAVY

A Riser Cutting Problem May Confront You!

The picture at the right represents a typical problem that was solved with a Kling Friction Saw.

The hollow risers were removed from these castings in a floor-to-floor time of only 40 SECONDS! The savings in **grinding wheels alone** was sufficient to pay for the **entire** equipment in **six months' time!**

The Kling Friction Saw is not an experiment. In hundreds of plants, Kling Saws are cutting thousands of tons of rails, flues, pipes, bars and structural shapes. In many modern foundries, Kling Saws are severing gates or risers from castings economically and with great speed. Kling Friction Saws will release men now employed at other cutting methods.

If you want to slash cutting costs and increase your production output, write for full details; complete information in our Bulletin No. 9200.

Kling Bros. Engineering Works
1316-C10 No. Kostner Ave. - Chicago 51, Illinois

Kling's corps. of engineers are always ready to consult with you on your particular cutting problems.

KLING'S FRICTION SAWS

CANADIAN RADIUM IN MODERN INDUSTRY

The Positive Way to Spot Internal Flaws —Check on Repairs

Radium locates and identifies on clear, permanent records, the internal quality of welding in steel and other types of metal fabrications ranging up to 10 inches or more in thickness. Welding procedure can be determined quickly and accurately—and the annealing checked for soundness.

Radium is economical—operates without power or mechanical attachments. No depreciation, no repairs, no replacements! Radium is portable, easily set up, operates without controls, examines many sections of varying size and contour in a single exposure.

Canadian Radium is readily available in units suited to your needs. For sale and for rent at moderate charges.

Write for Free Manual

Reliable, profusely illustrated 80-page textbook on the fundamentals and technique of modern industrial Radiography of Metals with Radium. Specially prepared for the metals industry by our research and technical staff. Write for your copy today, giving your name and company position.

R-94

CANADIAN RADIUM & URANIUM CORPORATION

630 FIFTH AVE., ROCKEFELLER CENTER, NEW YORK 20, N.Y.

WHERE-TO-BUY

CORE SAND MIXERS (Cont'd.)
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Royer Foundry & Machine Co., Kingston, Pa.

CORE SPRAYERS
Freeman Supply Co., 1152 Broadway, Toledo 5, Ohio.

CORE TRUCKS
Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.
Kirk & Blum Mfg. Co., 2838 Spring Grove Ave., Cincinnati 25, O.

CORE VENTS
Champion Foundry & Machine Co., 1314 W. 21st St., Chicago, Ill.
Demmler, Wm., & Bros., Kewanee, Ill.
Smillie, C. M., & Co., 1100 Woodward Hgts. Blvd., Ferndale, Mich.
United Compound Co., Inc., 328 South Park Ave., Buffalo 4, N. Y.

CORE WASH
Bloomsbury Graphite Co., Bloomsbury, N. J.
Carborundum Co., Niagara Falls, N. Y.
Cities Service Oil Co., 3200 S. Western Ave., Chicago 8, Ill.
Corn Products Sales Co., 17 Battery Pl., New York City 4.
Dayton Oil Co., Dayton 1, O.
Delta Oil Products Co., Milwaukee 9, Wis.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Foundry Services Inc., 280 Madison Ave., New York 16, N. Y.
Houghton Co., E. F., 303 West Lehigh Ave., Philadelphia 33, Pa.
McCormick, J. S., Co., 25th St. & A.V.R.R., Pittsburgh 22, Pa.
National Carbon Co. Inc., Carbon Products Div., Cleveland 1, Ohio.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis Sts., Philadelphia 24, Pa.
Penola Inc., Pittsburgh 1, Pa.
Pollard Oil Products Co., 1627 So. 44th St., Milwaukee 14, Wis.
Smith Facing & Supply Co., 1857 Carter Rd., Cleveland 13, O.
Stevens, Frederic B., Inc., Detroit 26, Mich.
Titanium Alloy Mfg. Co., Niagara Falls, N. Y.
United Oil Mfg. Co., 1429 Walnut St., Erie, Pa.
United States Graphite Co., Saginaw, Mich.

CORE WIRE
Progressive Core Wire Co., 1025 Bronson Court, S. E., Cleveland 15, O.

CORE WIRE CUTTERS
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.

CORE WIRE STRAIGHTENERS
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.

COUPLINGS (Flexible)
Ajax Flexible Coupling Co., Westfield, N. Y.

CRANES (Bucket)
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CRANE CONTROL (Electric)
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

CRANE LUBRICATING SYSTEMS
Blaw-Knox Co., Farmers Bank Bldg., Pittsburgh, Pa.

CRANES (Crawler)
Link Belt Speeder Corp., 307 N. Michigan Ave., Chicago, Ill.

CRANES (Electric)
Link Belt Speeder Corp., 307 N. Michigan Ave., Chicago, Ill.

CRANES (Electric Traveling)
American MonoRail Co., 13104 Athens Ave., Cleveland 7, O.
Cleveland Tramrail Div., of Cleveland Crane & Engineering Co., 1155 East 283rd St., Wickliffe, O.
Conco Engineering Works, Mendota, Ill.
Erie Steel Construction Co., Erie, Pa.
Northern Engineering Works, 2615 Atwater, Detroit, Mich.
Reading Chain & Block Corp., 2108 Adams St., Reading, Pa.
Shepard-Niles Crane & Hoist Corp., 360 Schuyler Ave., Montour Falls, N. Y.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CRANES (Gantry)
Modern Equipment Co., Dept. 199, Port Washington, Wis.
Wellman Engineering Co., 7000 Central Ave., Cleveland 4, O.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CRANES (Hand Travelling)
American MonoRail Co., 13104 Athens Ave., Cleveland 7, O.
Chicago Tramrail Co., 2910 Carroll Ave., Chicago 12, Ill.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., 1155 East 283rd St., Wickliffe, O.
Modern Equipment Co., Dept. 199, Port Washington, Wis.
Reading Chain & Block Corp., 2108 Adams St., Reading, Pa.
Shepard-Niles Crane & Hoist Corp., 360 Schuyler Ave., Montour Falls, N. Y.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CRANES (Jib)
American MonoRail Co., 13104 Athens Ave., Cleveland 7, O.
Chicago Tramrail Co., 2910 Carroll Ave., Chicago 12, Ill.
Modern Equipment Co., Dept. 199, Port Washington, Wis.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CRANES (Monorail)
American MonoRail Co., 13104 Athens Ave., Cleveland 7, O.
Chicago Tramrail Co., 2910 Carroll Ave., Chicago 12, Ill.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., 1155 East 283rd St., Wickliffe, O.
Conco Engineering Works, Mendota, Ill.
Shepard-Niles Crane & Hoist Corp., 360 Schuyler Ave., Montour Falls, N. Y.
Modern Equipment Co., Dept. 199, Port Washington, Wis.

CRANES (Portable, Electric)
Automatic Transportation Co., 121 West 87th St., Chicago 20, Ill.
Link Belt Speeder Corp., 307 N. Michigan Ave., Chicago, Ill.

CRUCIBLES
American Crucible Co., Shelton, Conn.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Dixon, Joseph, Crucible Co., Jersey City, N. J.
Lava Crucible Co., Pittsburgh, Pa.
National Carbon Co. Inc., Carbon Products Div., Cleveland 1, O.
Ross-Tacony Crucible Co., Tacony, Philadelphia, Pa.
Vesuvius Crucible Co., Swissvale, Pa.

CRUCIBLE FURNACES
Campbell-Hausfeld Co., Harrison, O.
Fisher Furnace Co., 5525 N. Wolcott Ave., Chicago 40, Ill.
W. S. Rockwell Co., 56 Church St., New York 7, N. Y.

CRUCIBLE LIFTERS
Modern Equipment Co., Dept. 199, Port Washington, Wis.

CRUCIBLE POURING DEVICES
Modern Equipment Co., Dept. 199, Port Washington, Wis.

CRUSHERS & PULVERIZERS (Coal)
Jeffrey Mfg. Co., 907-99 N. Fourth St., Columbus 16, O.

CUPOLAS
Modern Equipment Co., Dept. 199, Port Washington, Wis.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CUPOLA BLOWERS
Roots-Connersville Blower Corp., 302 Madison Ave., Connersville, Ind.
Sturtevant, B. F., Co., Hyde Park, Boston, Mass.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CUPOLA CHARGING MACHINES
American MonoRail Co., 13104 Athens Ave., Cleveland 7, O.
Modern Equipment Co., Dept. 199, Port Washington, Wis.
Shepard-Niles Crane & Hoist Corp., 360 Schuyler Ave., Montour Falls, N. Y.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CUPOLA CONTROL EQUIPMENT
Carman, Edwin S., Lee Rd. at Mayfield, Cleveland 18, O.
Foxboro Company, Foxboro, Mass.

—When writing advertisers, please mention THE FOUNDRY—

GLUTRIN
LIQUID BINDER

GOULAC
DRY BINDER

For

CORE WORK, SAND FACINGS, SPRAYS

Write for pamphlets giving detailed information. Both materials carried in stock by America's foremost foundry jobbers

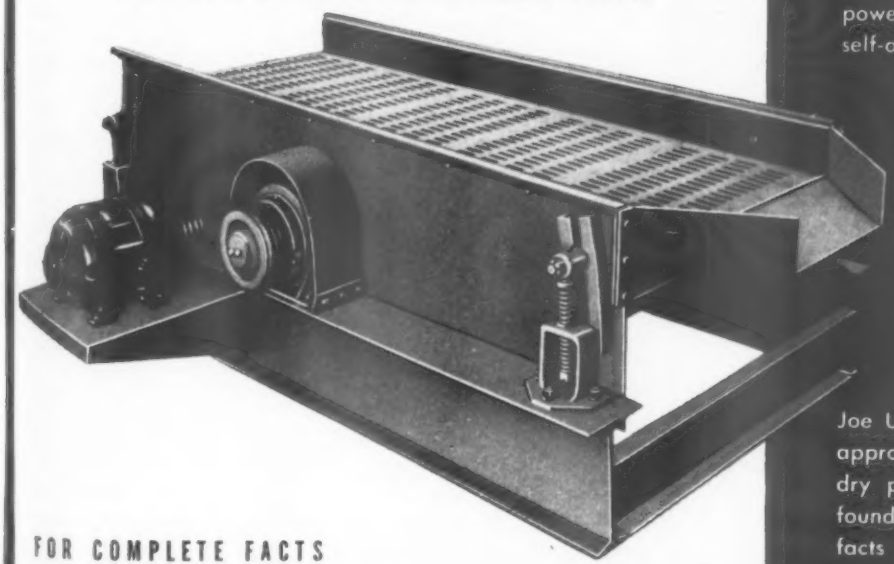
Robeson Process Company
(Established 1905)

American Gum Products Company
(Established 1915)

GENERAL OFFICES: 500 FIFTH AVENUE • NEW YORK 18, N. Y.

BIG JOE

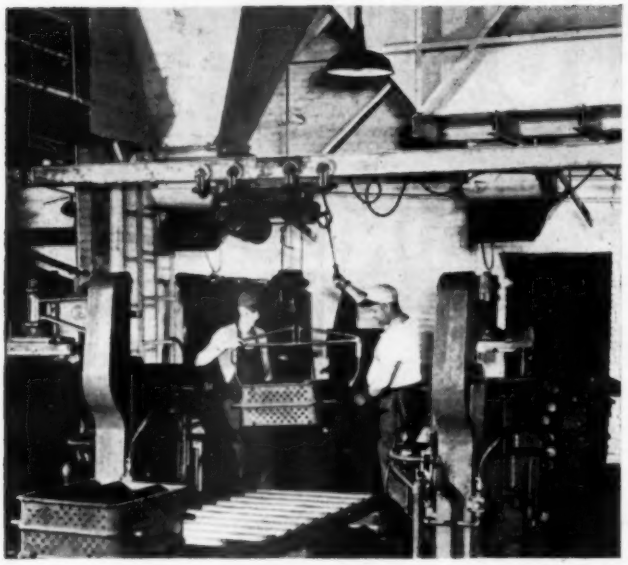
FOUNDRY SHAKE-OUT UNIT SPEEDS SHAKE-OUT OPERATIONS



Many features of the Big Joe make it a steady, fast, and efficient foundry shake-out unit. Adjustable coil springs insure constant tension and perfect balance. Counter-balanced crankshaft eliminates frame vibration, reduces power consumption. Four spherical, self-aligning, fully enclosed bearings minimize torque vibration and insure long life. Heavy steel plate and I-beam construction give structural strength. The Big Joe Shake-out unit does a top-notch job of shaking out castings of any size. Each Big Joe unit is built to the size best suited to your needs and is equipped with a screen according to your specifications. Big Joe Units are now available on WPB approved orders, for increasing foundry production and decreasing your foundry costs. Write today for further facts about Big Joe Shake-out units.

FOR COMPLETE FACTS
WRITE FOR BULLETIN NO. 10
JACKSON & CHURCH COMPANY, SAGINAW, MICHIGAN

CUT YOUR COSTS



with Modern Equipment

If you are planning to modernize your foundry anytime in the next five years—DO IT NOW! The coming peacetime competition will require the best quality of castings at reduced costs. Modern equipment and properly engineered layout will be two of your best salesmen in getting business, as well as producing volume and profits.

LOOK AT YOUR FOUNDRY! Is your old equipment slow in operation, expensive to maintain? Are you in a jam in one department, waiting for work in another? MAHR can supply you with practically anything in modern drying and sand handling equipment,—and the know-how to get the utmost out of it.

Consult MAHR Engineers

Many foundries are now being modernized by MAHR engineers. You will not be obligated in finding out what MAHR recommends to put your foundry in top-notch condition. Send the coupon below today—or write us—and indicate the equipment you may need, also what your production problems are.

MAHR MANUFACTURING CO.
Division of Diamond Iron Works, Inc.
1709 North Second St., Minneapolis 11, Minn.

GENTLEMEN: DEPT F1044

Give us information quickly about the following:

- ☐ Core ovens
- ☐ Mold ovens
- ☐ Portable mold dryers
- ☐ Torches
- ☐ Mold conveyors
- ☐ Sand slingers
- ☐ Sand conveyors
- ☐ Heat treat furnaces
- ☐ Melting furnaces
- ☐ Ladle heaters
- ☐ Ladle dryers
- ☐ Complete engineering service
- ☐ Shake outs
- ☐ Vibrating screens

NAME_____

FIRM_____

CITY_____ STATE_____

WHERE-TO-BUY

CUPOLA DUST ARRESTORS
Schneible Co., Claude B., 2827—25th St., Detroit 16, Mich.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CUPOLA LIGHTERS
Hauck Mfg. Co., 106 Tenth St., Brooklyn 15, N. Y.

CUPOLA LININGS
Carborundum Co., Niagara Falls, N. Y.
Cleveland Quarries Co., Cleveland 15, O.
Firegan Sales Co., 1691 Board of Trade Bldg., Chicago, Ill.
Ironton Fire Brick Co., Ironton, O.
United States Graphite Co., Saginaw, Mich.

CUPOLA SPARK ARRESTORS
Whiting Corp., 15607 Lathrop Ave., Chicago, Ill.

CUTOFF MACHINES (Abrasive)
Clipper Mfg. Co., 4030 Manchester, St. Louis, Mo.
Fox Grinders Inc., Oliver Bldg., Pittsburgh, Pa.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.

CUTTING OILS
Houghton Co., E. F., 303 West Lehigh Ave., Philadelphia 33, Pa.
Penola Inc., Pittsburgh 1, Pa.

DARK ROOM ACCESSORIES (X-Ray)
Eastman Kodak Co., Rochester, N. Y.
General Electric X-Ray Corp., 2012 Jackson Blvd., Chicago 12, Ill.
Picker X-Ray Corp., 300 Fourth Ave., New York City 1.

DARK ROOM PROCESSING (Chemical Tanks, etc.)
Eastman Kodak Co., Rochester, N. Y.
General Electric X-Ray Corp., 2012 Jackson Blvd., Chicago 12, Ill.
Picker X-Ray Corp., 300 Fourth Ave., New York City 10.

DEGASIFIERS
American-British Chemical Inc., 180 Madison Ave., New York 16.
Foundry Services Inc., 280 Madison Ave., New York 16, N. Y.
Lithaloys Corporation, 444 Madison Ave., New York.
Niagara Falls Smelting & Refining Corp., 2204 Elmwood Ave., Buffalo 17, New York.

DEOXIDIZERS
Ajax Metal Co., 46 Richmond St., Philadelphia 23, Pa.
American Smelting & Refining Co., 120 Broadway, New York 5.
Cleveland Flux Co., 1026 Main St., Cleveland 13, O.
Lithaloys Corporation, 444 Madison Ave., New York.
Niagara Falls Smelting & Refining Corp., 2204 Elmwood Ave., Buffalo 17, New York.

DESULPHURIZERS
Cleveland Flux Co., 1026 Main St., Cleveland 13, O.
Hercules Powder Co., 999 Market St., Wilmington 99, Del.
Mathieson Alkali Works, Inc., 60 E. 42nd St., New York 17, N. Y.
Modern Equipment Co., Dept. 199 Port Washington, Wis.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

DIES
Acme Pattern & Tool Co., Inc., 232 N. Findlay St., Dayton 3, O.
City Pattern Foundry & Machine Co., 1161 Harper Ave., Detroit 11, Mich.

DOWEL PINS
Standard Horse Nail Corp., New Brighton, Pa.

DRAGLINES (Crawler)
Link Belt Speeder Corp., 307 N. Michigan Ave., Chicago, Ill.

DRILLS (Pneumatic)
Cleveland Pneumatic Tool Co., 3781 East 77th St., Cleveland 5, O.
Gardner-Denver Co., Gardner Drive, Quincy, Ill.
Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago, Ill.
Schramm Inc., West Chester, Pa.

DRILL PRESSES
Delta Mfg. Co., Industrial Div., 620 E. Vienna Ave., Milwaukee 1, Wis.

DRIVES (Reciprocating)
Ajax Flexible Coupling Co., Westfield, N. Y.

DRUMS (Magnetic)
Dings Magnetic Separator Co., 512 E. Smith St., Milwaukee 7, Wis.
Stearns Magnetic Mfg. Co., 662 S. 28th St., Milwaukee 4, Wis.

DUMP HOPPERS
Roura Iron Works, 1405 Woodland Ave., Detroit 11, Mich.

DUST ARRESTING EQUIPMENT
American Air Filter Co., Inc., 266 Central Ave., Louisville 8, Ky.
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Bartlett & Snow, C. O., Co., 6201 Harvard Ave., Cleveland 5, O.
Buell Engineering Co., 14 Cedar St. New York 5, N. Y.
Kirk & Blum Mfg. Co., 2838 Spring Grove Ave., Cincinnati 25, O.
Mahon, R. C., Co., 8650 Mt. Elliott Ave., Detroit 11, Mich.
Pangborn Corp., Hagerstown, Md.
Parsons Engineering Corp., Cleveland 4, O.
Peters-Dalton Inc., 628 E. Forest Ave., Detroit 1, Mich.
Ruemelin Mfg. Co., 3850 N. Palmer St., Milwaukee 12, Wis.
Schneible Co., Claude B., 2827—25th St., Detroit 16, Mich.
Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O.
Sturtevant Co., B. F., Hyde Park, Boston, Mass.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

DUST RECOVERY SYSTEMS
American Foundry Equipment Co. Mishawaka, Ind.
Buell Engineering Co., 14 Cedar St. New York City 5.
Kirk & Blum Mfg. Co., 2838 Spring Grove Ave., Cincinnati 25, O.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

ELECTRIC FURNACES (See Furnaces, Electric)

ELECTRODES (Graphite and Amorphous)
National Carbon Co. Inc., Electrode Sales Div., 30 E. 42nd St., New York 17.

ELEVATORS
Standard Conveyor Co., North St. Paul 9, Minn.

ELEVATORS (Bucket)
Bartlett & Snow Co., C. O., 6201 Harvard Ave., Cleveland 5, O.
Chain Belt Co., 1671 W. Bruce St. Milwaukee 4, Wis.
Manhattan Rubber Mfg. Div. of Raybestos Manhattan Inc., Passaic, N. J.

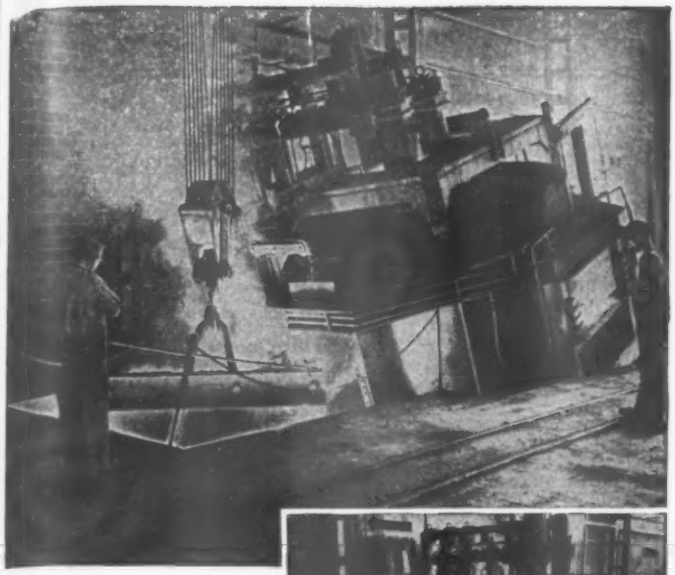
ELEVATORS (Material Handling)
Chain Belt Co., 1671 W. Bruce St. Milwaukee 4, Wis.
Link Belt Co., 300 W. Pershing Rd. Chicago 9, Ill.

ELEVATORS (Pneumatic, Material Handling)
Fuller Company, Catasaqua, Pa.

ENGINEERING SERVICE (Foundry)
Carman, Edwin S., Lee Rd. at Mayfield, Cleveland 18, O.
Conover Engineering Co., 1740 East 12th St., Cleveland 14, O.
Giele, Walter, Co., First National Bank Bldg., Lebanon, Pa.
Kawin Co., Chas. C., 431 S. Dearborn St., Chicago 5, Ill.
Payne, W. Harvey, 141 W. Jackson, Chicago 4, Ill.
Wickland Co., A. A., 205 W. Wacker Dr., Chicago 6, Ill.

EXHAUST SYSTEMS
American Air Filter Co., Inc., 266 Central Ave., Louisville 8, Ky.
American Foundry Equipment Co. 505 S. Byrkit St., Mishawaka, Ind.
DeBothezat Ventilating Div., American Machine & Metals Co. East Moline, Ill.
Kirk & Blum Mfg. Co., 2838 Spring Grove Ave., Cincinnati 25, O.
Pangborn Corporation, Hagerstown, Md.
Parsons Engineering Corp., Cleveland 4, O.

—When writing advertisers, please mention THE FOUNDRY—



Floor-mounted, cylindrical shell, Type 20 Heroult Furnace for the production of stainless steel. An all-welded unit designed for charging with an open-hearth charging machine, equipped with rocker type tilting mechanism, and embodying all latest improvements.

Heroult
ELECTRIC FURNACES

AMERICAN BRIDGE Heroult Electric Furnaces now embody novel and distinctive features—the result of constant striving to perfect the most modern and economical tool for efficient melting and refining of iron and steel for castings, high grade alloy, tool and stainless steels.

Dependent on size and operating requirements, they are adaptable to hand, chute, machine or drop-bottom bucket charging. Capacity ratings range from ½ to 100 tons.

Why not avail yourself of the technical knowledge and wide practical experience of our furnace specialists for your specific requirements.

AMERICAN BRIDGE COMPANY

General Offices: Frick Building, Pittsburgh, Pa.

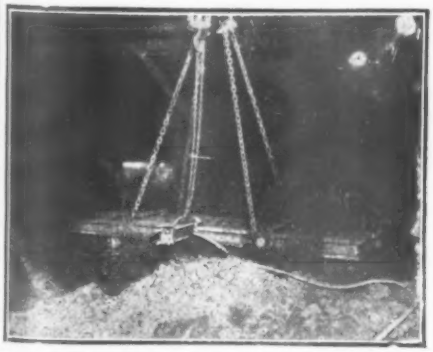
Baltimore · Boston · Chicago · Cincinnati · Cleveland · Denver
Detroit · Duluth · Minneapolis · New York · Philadelphia · St. Louis
Columbia Steel Company, San Francisco, *Pacific Coast Distributors*
United States Steel Export Company, New York

USS

UNITED STATES STEEL

YOU CANNOT AFFORD TO BE WITHOUT THE "BRANFORD" FLASK RAPPER

- The "Branford" Flask Rapper is not a new development. Hundreds of them have been in constant use in many of the progressive foundries for over the last twenty years.
- The "Branford" Flask Rapper cuts down flask shakeout time and labor expense to a minimum.



5" Flask Rapper shaking out copes 5' dia. to 10'6"x20'0"x12" deep.

- Eliminates damage to flask—wood, pressed steel or cast iron.
- Portable—Easily carried to the job. No central shakeout necessary.
- Made in sizes 2" piston diameter to 8" piston diameter. Capacities ranging from smallest to largest size flasks.
- Jaw construction will take wide variation of flask flanges without change.

SEND FOR QUESTIONNAIRE · Dept. 5 · WE WILL QUOTE PROMPTLY
DISTRIBUTORS IN PRINCIPAL FOUNDRY CENTERS

Hopper Vibrators
Container Loading Vibrators
Annealing Pot Vibrators
Vibrator Tables

NEW HAVEN VIBRATOR CO.

1915 BRANFORD VIBRATORS U.S.A.

NEW HAVEN, CONNECTICUT

Branford Plate Vibrators
Air Tool Fittings
Sprayers, All Kinds
Shake-Out Vibrators

SAVE *Critical* TIME!

TIME CANNOT BE SALVAGED

Once it's gone there's no reclaiming it. But you can cut your finishing time 'way down with Haskins Flexible Shaft Equipment. Forget old hand-finishing methods. Your men will work faster and better, with less fatigue, the Haskins way. Every hour will see increased production. Man-hours—plus machine-hours—will really mean something. For important new time-saver methods, send for your copy of Catalog 45. R. G. Haskins Company, 2742 W. Flournoy Street, Chicago, Illinois.

H-6

1/2 H.P. Countershaft drive, 4-speed —900—3400 R. P. M. Bench height pedestal mounting, 360 degree swivel.

HASKINS
Flexible Shaft
EQUIPMENT
More VERSATILE Machines for More PROFITABLE Work

WHERE-TO-BUY

EXHAUST SYSTEMS (Cont'd.)
Peters-Dalton Inc., 628 E. Forest Ave., Detroit 1, Mich.
Propellair Inc., Springfield, O.
Schneible Co., Claude B., 2827—25th St., Detroit 16, Mich.
Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O.
Sturtevant Co., B. F., Hyde Park, Boston, Mass.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

EYE SHIELDS and GOGGLES—See Goggles

FABRICATORS (Metal)
Kirk & Blum Mfg. Co., 2838 Spring Grove Ave., Cincinnati 25, O.
Roura Iron Works, 1405 Woodland Ave., Detroit 11, Mich.

FACINGS
Bondite Corporation, 844—150th St., Hammond, Ind.
Bondite Corporation, 2325 East 38th St., Los Angeles 11, Calif.
Delta Oil Products Co., Milwaukee 9, Wis.
Stevens, Inc., Frederic B., Detroit 26, Mich.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
National Carbon Co. Inc., Carbon Products Div., Cleveland 1, Ohio.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis St., Philadelphia 24, Pa.
Titanium Alloy Mfg. Co., Niagara Falls, N. Y.
United States Graphite Co., Saginaw, Mich.
Woodison Co., E. J., 7515 St. Aubin Ave., Detroit 11, Mich.

FANS (Ventilating, Exhaust, Cooling, etc.)
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
DeBothezat Ventilating Div., American Machine & Metals Co., East Moline, Ill.
General Blower Co., 406 N. Peoria St., Chicago 22, Ill.
Kirk & Blum Mfg. Co., 2838 Spring Grove Ave., Cincinnati 25, O.
Mahr Mfg. Co., Div. of Diamond Iron Works, Minneapolis, Minn.
Pangborn Corp., Hagerstown, Md.
Propellair Inc., Springfield, O.
Sturtevant Co., B. F., Hyde Park, Boston, Mass.

FEEDERS (Rotary)
Fuller Company, Catasaqua, Pa.

FEEDERS (Sand)
Bartlett & Snow Co., C. O., 6201 Harvard Ave., Cleveland 5, O.

FERROBORON
Molybdenum Corp. of America, Pittsburgh 19, Pa.

FERROCHROME
Hickman-Williams & Co., Cleveland, O.
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York 17, N. Y.
Ohio Ferro-Alloys Corp., Canton 2, O.

FERROMANGANESE
Bethlehem Steel Co., Bethlehem, Pa.
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York 17, N. Y.
Ohio Ferro-Alloys Corp., Canton 2, O.

FERROMOLYBDENUM
Climax Molybdenum Co., 500 Fifth Ave., New York 18, N. Y.
Molybdenum Corporation of America, Pittsburgh 19, Pa.

FERROSILICON
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York 17, N. Y.
Globe Iron Co., Jackson, Ohio.
Jackson Iron & Steel Co., Jackson, O.
Ohio Ferro-Alloys Corp., Canton 2, O.

FERROTITANIUM
Titanium Alloy Mfg. Co., Niagara Falls, N. Y.

FERROTUNGSTEN
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York 17, N. Y.
Molybdenum Corp. of America, Pittsburgh 19, Pa.

FERROVANADIUM
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York 17, N. Y.

FILLET (Leather)
Page Belting Co., Concord, N. H.

FILMS (X-Ray)
Eastman Kodak Co., Rochester, N. Y.
General Electric X-Ray Corp., 2012 Jackson Blvd., Chicago 12, Ill.
Picker X-Ray Corp., 300 Fourth Ave., New York City 1.

FILTERS (Air)
American Air Filter Co., 266 Central Ave., Louisville 8, Ky.
Dollinger Corporation, 36 Centre Park, Rochester 4, N. Y.

FILTERS (All Types)
Dollinger Corporation, 36 Centre Park, Rochester 4, N. Y.

FIRE BRICK
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Stevens, Inc., Frederic B., Detroit 26, Mich.
Illinois Clay Products Co., Joliet, Ill.
Ironton Fire Brick Co., Ironton, O.
Norton Co., Worcester 6, Mass.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis St., Philadelphia 24, Pa.
Taylor Sons Co., Chas., Cincinnati, O.

FIRE CLAY
Eastern Clay Products, Inc., Elfort, O.
Great Lakes Foundry Sand Co., United Artists Bldg., Detroit 26, Mich.
Illinois Clay Products Co., Joliet, Ill.
Ironton Fire Brick Co., Ironton, O.
Taylor Sons Co., Chas., Cincinnati, O.

FIRE SAND
Carborundum Co., Niagara Falls, N. Y.
Cleveland Quarries Co., 1125 Builders Exchange Bldg., Cleveland 15, O.

FIRESTONE
Cleveland Quarries Co., 1125 Builders Exchange Bldg., Cleveland 15, O.
Firegan Sales Co., 1691 Board of Trade Bldg., Chicago, Ill.
Great Lakes Foundry Sand Co., United Artists Bldg., Detroit 26, Mich.

FLASKS (Aluminum)
Adams Co., 700 Foster St., Dubuque, Iowa.
Fremont Flask Co., Fremont, O.
Hines Mfg. Co., 1324 Hird Ave., Cleveland 7, O.

FLASKS (Dowmetal)
Fremont Flask Co., Fremont, O.
Hines Mfg. Co., 1324 Hird Ave., Cleveland 7, O.

FLASK FILLERS
Jeffrey Mfg. Co., 907-99 N. Fourth St., Columbus 16, O.

FLASKS (Slip)
Adams Co., 700 Foster St., Dubuque, Ia.
Fremont Flask Co., Fremont, O.
Freeman Supply Co., Toledo 5, O.
Hines Mfg. Co., 1324 Hird Ave., Cleveland 7, O.

FLASKS (Snap)
Adams Co., 700 Foster St., Dubuque, Iowa.
Arcade Manufacturing Co., Freeport, Ill.
Diamond Clamp & Flask Co., Richmond, Ind.
Stevens, Inc., Frederic B., Detroit 26, Mich.
Fremont Flask Co., Fremont, O.
Hines Mfg. Co., 1324 Hird Ave., Cleveland 7, O.

FLASKS (Steel)
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.
Truscon Steel Co., Youngstown 1, O.

FLASK FITTINGS
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Hines Mfg. Co., 1324 Hird Ave., Cleveland 7, O.
Truscon Steel Co., Youngstown 1, O.

FLASK LUMBER
Dougherty Lumber Co., 4300 E. 68th St., Cleveland 5, O.

FLASKS (Wood)
Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.

FLEXIBLE SHAFT MACHINERY
Haskins Co., R. G., 615 So. California Ave., Chicago 12, Ill.
Mall Tool Co., 7720 South Chicago Ave., Chicago 19, Ill.
Strand Co., N. A., 5001 N. Wolcott Ave., Chicago 40, Ill.

—When writing advertisers, please mention THE FOUNDRY—

285 Molds
DAILY · PRODUCTION!

More than 285 molds a day are being made on Moline Squeezers with 12″ x 16″ flasks in regular production! No. 4 machine, shown here, will handle flasks 16″ x 30″ or under. Width inside to inside of wheels, 65″. Height of table above floor, 30″. Table dimensions, 21″ x 16″. Pressure Plate, 8″ x 15″ (or furnished 12″ x 14″). No extra charge for set-off benches.

QUICK DELIVERY
LOW PRICES

4 MODELS TO CHOOSE FROM

Moline Iron Works
MOLINE, ILL., U. S. A.

MOLINE SQUEEZERS

What Manpower Shortage?

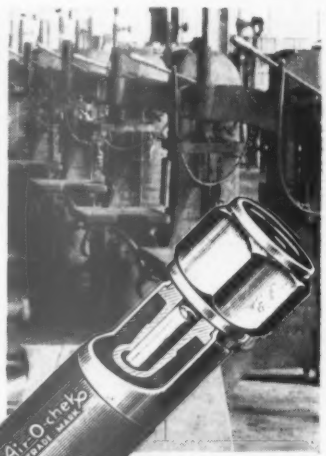
Could you use the untiring services of ten men at a total cost of only 8 cents per day? This is the service a type "V" Comb's Gyratory Riddle gives you. Test it yourself with a 30 day free trial. Only 5 feet over all, this riddle is easily handled by one man and its 20-inch sieve can be replaced in only 5 seconds.

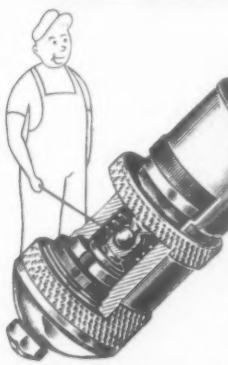
Comb's Gyratory Riddles are available in four types and sizes. Send for our catalog and make a selection to suit your need.

Type "V"
Price $175.00 F.O.B. Leavenworth

GREAT WESTERN MFG. CO.
(NOT INC)
Leavenworth, Kansas

Foundries Save AIR and TIME with Air-O-chek AIR GUNS





Precision made of bar brass and stainless steel.

No Leaks
No Levers
No Packing

Nothing to get out of order. Years of troublefree performance without attention. That's why leading plants have bought thousands of AIR-O-CHEKS. Install a dozen and compare results with the best you have ever had. Remember AIR-O-CHEKS have the name stamped in the head. Only AIR-O-CHEKS have the ball and socket connecting the enclosed lever to the valve. Sizes for all requirements. Prompt shipment on high priority.

AIR-WAY PUMP & EQUIP. CO., 405 S. Jefferson St., Chicago 7, Ill.

BELLEVUE

Hydraulic Nose Tilt Melting Furnaces for Aluminum, Magnesium, and Other Non-Ferrous Metals

Crucible or Pot Types — Gas or Oil-Fired

The 1000 lb. Aluminum Crucible Type Melting Furnace illustrated is one of many sizes ranging up to 3000 lb. capacity. All have the exclusive "flat-top" feature.

Less floor space and height is required.

BELLEVUE INDUSTRIAL FURNACE CO.
2975 Bellevue Ave. Detroit, Mich.

SAMUEL GREENFIELD CO., INC., SMELTERS and REFINERS

The Toast OF THE **FOUNDRY INDUSTRY**

Greenfield BETTER No. 12 ALUMINUM INGOTS

The Champagne of No. 12 Aluminum Ingots . . . for economy, castability, machineability and consistently better results. Ingot quotations on request.

Greenfield's complete scientific Research Department is always ready to assist you with all your ingot problems.

Samuel Greenfield Co., Inc.
Manufacturers of BRASS, BRONZE and ALUMINUM INGOTS
31 STONE STREET — HUmboldt 4050 — BUFFALO 12, N.Y.

WHERE-TO-BUY

FLOORING (Non-Slip)
Norton Co., Worcester 6, Mass.

FLUXES
American-British Chemical Inc., 180 Madison Ave., New York 16.
Cleveland Flux Co., 1026 Main St., Cleveland 13, O.
Foundry Services Inc., 280 Madison Ave., New York 16, N. Y.
Mathieson Alkali Works, Inc., 60 E. 42nd St., New York 17, N. Y.
National Gypsum Co., Buffalo 2, N. Y.
Niagara Falls Smelting & Refining Corp., 2204 Elmwood Ave., Buffalo 17, N. Y.

FOUNDRY NAILS
Capewell Mfg. Co., Hartford, Conn.
Standard Horse Nail Corp., New Brighton, Pa.

FOUNDRY SHOVELS
(See SHOVELS)

FOUNDRY SUPPLY HOUSES
Buckeye Products Co., 7022 Vine St., Cincinnati 16, O.
Combined Supply & Equipment Co., Inc., 215 Chandler St., Buffalo 7, N. Y.
Eastern Clay Products, Inc., Effort, O.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Freeman Supply Co., 1152 E. Broadway, Toledo 5, O.
Midwest Foundry Supply Co., Edwardsville, Ill.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis Sts., Philadelphia 24, Pa.
Stevens, Inc., Frederic B., Detroit 26, Mich.
Woodison Co., E. J., 7515 St. Aubin Ave., Detroit 11, Mich.

FURNACES (Aluminum & Magnesium Billets)
Despatch Oven Co., Minneapolis 14, Minn.
Loftus Engineering Co., Oliver Bldg., Pittsburgh 22, Pa.
W. S. Rockwell Co., 56 Church St., New York 7, N. Y.

FURNACES (Aluminum & Magnesium Forgings)
Despatch Oven Co., Minneapolis 14, Minn.
Kirk & Blum Mfg. Co., 2838 Spring Grove Ave., Cincinnati 25, O.
W. S. Rockwell Co., 56 Church St., New York 7, N. Y.

FURNACES (Aluminum Melting)
Ajax Engineering Corp., Trenton, N. J.

FURNACES (Aluminum Rivet Heating)
Ajax Electric Co., Inc., Philadelphia 23, Pa.
Despatch Oven Co., Minneapolis 14, Minn.

FURNACE LININGS
Campbell-Hausfeld Co., Harrison, O.
Carborundum Co., Niagara Falls, N. Y.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Firegan Sales Co., 1691 Board of Trade Bldg., Chicago, Ill.
Fisher Furnace Co., 5535 N. Wolcott Ave., Chicago 40, Ill.
Ironton Fire Brick Co., Ironton, O.
National Carbon Co. Inc., Carbon Products Div., Cleveland 1, O.
Stroman Furnace & Engineering Co., 300 W. Adams St., Chicago 6, Ill.
United States Graphite Co., Saginaw, Mich.

FURNACES (Annealing)
Bellevue Industrial Furnace Co., 2975 Bellevue Ave., Detroit 7, Mich.
Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, O.
Dempsey Industrial Furnace Corp., Springfield 5, Mass.
Despatch Oven Co., Minneapolis, Minn.
Electric Furnace Co., Salem, O.
Gehnrich Oven Div., W. S. Rockwell Co., 56 Church St., New York 7, N. Y.
Johnston Mfg. Co., Minneapolis 13, Minn.
Lindberg Engineering Co., 2448 West Hubbard, Chicago 12, Ill.
W. S. Rockwell Co., 56 Church St., New York 7, N. Y.
Vulcan Corporation, 18th & Cherry Sts., Philadelphia 3, Pa.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

FURNACES (Crucible Melting)
Ajax Metal Co., Philadelphia 23, Pa.
Campbell-Hausfeld Co., 300-330 Moore St., Harrison, O.
Fisher Furnace Co., 5535 N. Wolcott Ave., Chicago 40, Ill.
Johnston Mfg. Co., Minneapolis 13, Minn.
Mahr Mfg. Co., Div. of Diamond Iron Works, Minneapolis, Minn.
W. S. Rockwell Co., 56 Church St., New York 7, N. Y.
Stroman Furnace & Engineering Co., 300 W. Adams St., Chicago 6, Ill.

FURNACES (Electric Melting)
Ajax Engineering Corp., Trenton, N. J.
Ajax Metal Co., Philadelphia 23, Pa.
American Bridge Co., Pittsburgh 19, Pa.
Detroit Electric Furnace Div. of Kuhlman Electric Co., Bay City, Mich.
Electric Furnace Co., Salem, O.
Pittsburgh Lectromelt Furnace Corp., P. O. Box 1125, Pittsburgh, Pa.
Swindell-Dressler Corp., Pittsburgh, Pa.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

FURNACES (Gas or Oil Fired)
Bellevue Industrial Furnace Co., 2975 Bellevue Ave., Detroit 7, Mich.
Campbell-Hausfeld Co., Harrison, O.
Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, O.
Dempsey Industrial Furnace Corp., Springfield 5, Mass.
Electric Furnace Co., Salem, O.
Fisher Furnace Co., 5535 N. Wolcott Ave., Chicago 40, Ill.
Johnston Mfg. Co., Minneapolis 13, Minn.
Lindberg Engineering Co., 2448 West Hubbard, Chicago 12, Ill.
Radiant Combustion Inc., Warren, Ohio.
W. S. Rockwell Co., 56 Church St., New York 7, N. Y.
Stroman Furnace & Engineering Co., 300 W. Adams St., Chicago 6, Ill.
Vulcan Corporation, 18th & Cherry Sts., Philadelphia 3, Pa.

FURNACES (Gray Iron Melting)
American Bridge Co., Pittsburgh 19, Pa.
Detroit Electric Furnace Div. of Kuhlman Electric Co., Bay City, Mich.
Pittsburgh Lectromelt Furnace Corp., P. O. Box 1125, Pittsburgh, Pa.
Swindell-Dressler Corp., Pittsburgh, Pa.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

FURNACES (Heat Treating)
Ajax Electric Co., Inc., Philadelphia 23, Pa.
Bellevue Industrial Furnace Co., 2975 Bellevue Ave., Detroit 7, Mich.
Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, O.
Dempsey Industrial Furnace Corp., Springfield 5, Mass.
Despatch Oven Co., Minneapolis 14, Minn.
Electric Furnace Co., Salem, O.
Johnston Mfg. Co., Minneapolis 13, Minn.
Lindberg Engineering Co., 2448 West Hubbard, Chicago 12, Ill.
Loftus Engineering Co., Oliver Bldg., Pittsburgh 22, Pa.
Maehler, Paul, Co., 2200 W. Lake St., Chicago 12, Ill.
Radiant Combustion Inc., Warren, Ohio.
W. S. Rockwell Co., 56 Church St., New York 7, N. Y.
Vulcan Corporation, 18th & Cherry Sts., Philadelphia 3, Pa.

FURNACES, Heat Treating (Electric)
Ajax Electric Co., Inc., Philadelphia 23, Pa.
Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, O.
Despatch Oven Co., Minneapolis 14, Minn.
Lindberg Engineering Co., 2448 West Hubbard, Chicago 12, Ill.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

FURNACES (Malleable Annealing)
Dempsey Industrial Furnace Corp., Springfield 5, Mass.

—When writing advertisers, please mention THE FOUNDRY—

Have You Seen This

HELPFUL LITERATURE?

***NOTE TO READERS:** If you will check the item or items described which particularly interest you, we will be glad to request the manufacturers concerned to send you their literature. Use the attached postal card*

1. Welding Cast Iron

Eutectic Welding Alloys Co. offers folder on Improved Process for welding cast iron. Very valuable information; well illustrated with "before" and "after" shots. Specifications for proper welding rod for gray iron, alloy and semi-steel, malleable iron, aluminum and magnesium, brass, bronze and nickel castings.

2. Metallizing Equipment

Metallizing Company of America has new sixteen page catalog dated July 1, 1944 on company's metallizing guns and equipment for metallizing; high pressure sandblast generators, sand blast cabinets, air dryers and coolers, filters, peening, scaling hammers, tool-post grinders, electric bonders, welding pistols, fluxes, metallizing wires, etc. Send for it.

3. Rotary Files

Grobet File Company presents complete catalog of line of hand cut and ground from the solid rotary files. Hand cut files are recommended for filing steel and hard metals. Ground from the solid files are recommended for filing aluminum, magnesium and soft metals.

4. Convection Furnaces

Surface Combustion Company offers their Bulletin CG-43 on Standand Rated Convection Furnaces for rapid heating of a compact mass of small parts at a relatively low temperature. Bulletin shows cutaway drawings of the furnace; also photos of various installations.

5. Control Instruments

Wheelco Instrument Co. has several bulletins on "Rheotrol" a device to maintain desired electric power or heat input or flow of liquids or gases; one on "Inputrol" which is a simplified timing device to be employed with any automatic control instrument and "Throttltrol" which is a simplified device for valve positioning. Send for all three.

6. Foundry Shakeout Unit

Jackson & Church Co. Bulletin No. 10 describing and illustrating their "BIG JOE" Foundry Shakeout Unit which has many new features and is claimed to speed up foundry production. Check this one.

7. Pyrometer for Surface Contact

Illinois Testing Laboratories have Bulletin No. 3511-B on company's Alnor Pyrocon pyrometers and Thermocouples for use with it. Fully illustrated and described.

8. Lift Trucks, Tractors, Etc.

Mercury Manufacturing Co. offers forty-two page Bulletin 7-11 very attractively illustrating line of Mercury Tractors, Trailers and Lift Trucks for all types of material handling. Features are well described and illustrated and a partial list of prominent users is given.

9. Dragline and Clam Shell Buckets

M. P. McCaffrey Inc. has interesting folder on line of "Rud-O-Matic" control single line buckets together with "Tagline" magnet reels for electric cable. These buckets are recommended especially for foundries for digging pits, filling large flasks, handling molding sand, unloading sand and coke and in fact any material handling problem.

10. Fire Prevention and Fighting

Randolph Laboratories Inc. presents mighty valuable book on fire fighting and company's line of emergency extinguishers and equipment for machine fires, electric fires, rubbish and wood fires and inflammable liquids. The carbon dioxide principle has been thoroughly approved.

11. Centrifugal Casting Methods

Centrifugal Casting Machine Co. has bound together a series of reprints on centrifugal casting methods which makes very informative reading on this method of casting metal. Twenty-four pages of good information.

12. Die Trucks and Elevating Tables

Lyon Raymond Corporation illustrates a new folder (Bulletin No. 135) to show time-saving handling of heavy dies with company's line of hydraulic trucks and elevating tables. Also welding positioners, lift trucks, pumps, stocking and tiering equipment, etc.

THE FOUNDRY *Readers' Service Dept.*
1213 West Third St., Cleveland 13, Ohio **October 1944**

Please have literature circled below sent to me.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25 26 27 28

Name _____ **Title** _____

Company _____

Products Manufactured _____

Address _____

City _____ **State** _____

This card must be completely filled out. Please TYPE or PRINT

13. Metal Cutting Band Saw

Machine Tool Div. of Kalamazoo Tank and Silo Co. presents advanced design metal cutting band saw and company's new coolant system which permits continuous high speed operation of the saw. Has many uses around a foundry.

14. Welding Generators

Sight Feed Generator Co. graphically illustrates line of welding gas generators in sixteen-page color booklet entitled "Sight Feed Saves 50% to 75% on Acetylene Costs". Construction and safety features are explained.

15. Pyrometers and Thermocouples

Elematic Equipment Corp. will mail Bulletin No. 401 showing portable and indicating pyrometers also standard thermocouples for various models.

16. Making Test Bars

Federated Metals Div. American Smelting & Refining Co. presents sixteen-page book containing wealth of information on how to make test bars to indicate the value of nonferrous castings. This should be in your files.

17. Patterns and Models of Gypsum

United States Gypsum Co. has fifty-four page beautifully illustrated book on how to make patterns and models with gypsum cement. All necessary accessories and equipment are illustrated as well as illustrated steps in procedure.

18. Carriers and Conveyor Systems

Lamson Corporation publishes booklet entitled "Case Histories to Aid You in Blueprinting Conversion to Peace". Interesting and informative and contains ideas for application to your own problems.

19. Monolithic Refractory Linings

Ironton Fire Brick Company presents color illustrated folder on company's product "Ironton Caro-Line" a refractory material for making one-piece linings for foundry ladles, converters, electric furnaces, cupola breast and slag holes, etc.

20. Heat Exchange Equipment

National Carbon Company Inc. calls attention to "Catalog Section M-8802" on immersion type heat exchangers, cascade type coolers, etc. made from "Karbate" a carbon or graphite material made impervious to seepage of liquids and gases under pressure.

21. Materials Handling

Towmotor Corporation offers beautiful plastic spiral bound book giving outline of twenty-five years of company history and illustrating by actual photography application of company's line of power lift trucks, tractors, etc.

22. Surface Peening for Metal Improvement

W. W. Sly Co. sending informative folder on this new method of improving the fatigue life of metals by shot-peening the surfaces; relieving stresses and strains caused by processing. Company also makes blast cleaning equipment, tumbling mills and dust control equipment.

23. Oxyacetylene Methods for Steel Foundries

Air Reduction Sales Co. presents thirty-two page book on cutting gates and risers, flame cutting, gouging, descaling, lancing, hardening, etc. with the acetylene flame. Completely illustrated actual applications as well as company's line of apparatus is all in this finely printed booklet.

24. Welding Positioners

Ransome Machinery Company wants you to have a copy of forty-page, two color book on complete line of welding positioners. Time and labor savings are claimed and book is very completely illustrated with specifications for various sizes of work.

25. Lubrication

Farval Corporation has issued Bulletin No. 207 on the safe and positive lubrication of hard-to-get-at bearings. Reduced lubricating costs and increased output are claimed. Also Bulletin No. 25 on centralized lubrication systems.

26. Sand Conditioning Equipment

Royer Foundry & Machine Co. has available for you 32-page booklet describing in detail company's line of sand conditioning equipment. Lavishly illustrated with action photos and drawings of various models. Also shows illustration of the combination sand conditioning and scrap removing units. Bulletin No. 744.

27. Snagging Wheels

Norton Company offers four-color bulletin on line of Resinoid Snagging wheels, core files and core cut-off wheels.

28. Casting Defect Chart

Harry W. Dietert Co. publishes recently "Foundryman's News Letter" which contains a casting defect chart and what to do to overcome the defects. Very valuable reference information for foundrymen and metallurgists.

FIRST CLASS
PERMIT No. 36
(Sec. 510 P.L.&R.)
Cleveland, Ohio

BUSINESS REPLY CARD
No Postage Stamp Necessary if Mailed in the United States

4c POSTAGE WILL BE PAID BY—

THE FOUNDRY
Penton Building
CLEVELAND 13, OHIO
Readers' Service Dept.

Hammond OF KALAMAZOO

HEAVY DUTY FOUNDRY GRINDER

SINGLE AND MULTI-SPEED! FULFILLS EVERY FOUNDRY MAN'S NEEDS

Plenty of power to spare! You can shove the biggest, roughest casting up against the wheel and know it will flash through with surging strength.

● SINGLE or MULTI-SPEEDS ● LARGER SPINDLES ● GREATER WHEEL ECONOMY ● MULTI V-BELT DRIVE ● LARGER BEARINGS ● STEEL PLATE GUARDS ● USE ANY STANDARD MOTOR ● MORE SPACE AROUND THE WHEELS

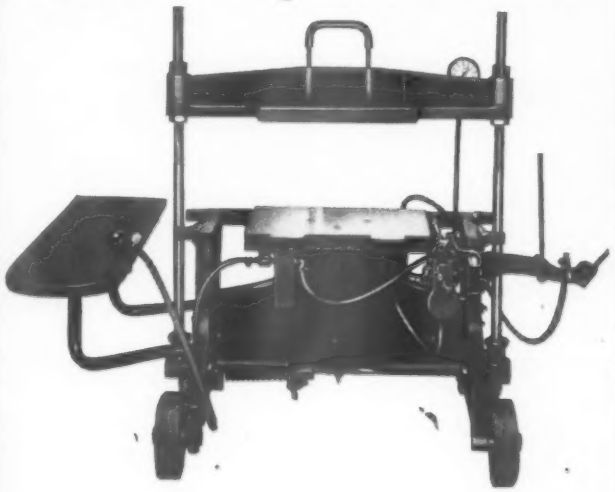
WRITE FOR COMPLETE SPECIFICATIONS

☐ WR-1 1, 2 and 3 Speeds 5, 7 and 10 H P ☐ WR-2 2, 3 and 4 Speeds 10, 15 and 20 H P

Hammond Machinery Builders INC

1605 Douglas Avenue • Eastern Branch—71 W. 23rd Street, New York 10, N. Y.

DEPENDABLE JOLT SQUEEZERS



	No. 91	No. 101
Jolt Cyl.	4″	5″
Squeeze Cyl.	10″	13″
Between Uprights	36″	38″

ARCADE MANUFACTURING CO.

Freeport, Illinois

EXAMPLE OF *Service:*

The Acme Foundry and Machine Co., of Blackwell, Okla., writes as follows:

"We have produced over 14 million pounds of high strength gray iron castings, while using Cities Service Delco Core Oils and Washes, exclusively, in our core room. At no time has there been a complaint."

You can always depend on the consistently high quality of Cities Service Delco Foundry Products . . . Why not call in your Cities Service Engineer for help in stepping up production and cutting down costs?

More and more, it's service that counts . . . and

Cities Service

means good service!

CITIES SERVICE OILS — ONCE-ALWAYS

CITIES SERVICE OIL COMPANY

ARKANSAS FUEL OIL COMPANY

PROMPT DELIVERY!—Made from the best grades of selected West Virginia by-product coking coals, TERRE HAUTE SPECIAL FOUNDRY COKE assures uniform cupola practice, better melting ratios, and satisfaction to users. *Its scrap and steel carrying capacity is unequalled! Order a trial now.*

Sold Exclusively by

REPUBLIC COAL & COKE CO.

8 South Michigan Ave., Chicago 3, Illinois

BRANCHES: Peoria • New York • Indianapolis • Milwaukee • Minneapolis • St. Louis
Detroit • Cleveland • Cincinnati

Manufactured at Terre Haute, Indiana by INDIANA GAS & CHEMICAL CORPORATION

HEAVY BEVEL SAFETY
(Reg. Trade Mark)
LETTERS and FIGURES

Deeper, clean impressions. Will not spall, will not mushroom. Any size character from 1/32" up.

IMMEDIATE DELIVERY

Write for data!

M.E. CUNNINGHAM CO.
SAFETY STEEL STAMPS
97 E. Carson St. Pittsburgh 19, Pa.

CARMAN ENGINEERS

REDUCE RECONVERSION LOSSES

Prepare Now For The Reconversion Period Ahead With Its Contract Terminations, Cancellations And Consequent Reduction In Business Volume. Place Your Business On A "Budget Basis."

CONSULT US FOR A PLAN

EDWIN S. CARMAN, INC., *Foundry Engineers and Consultants*
LEE ROAD AT MAYFIELD, CLEVELAND, OHIO

WHERE-TO-BUY

FURNACES (Malleable Annealing) (Cont'd.)
Electric Furnace Co., Salem, O.
General Electric Co., Schenectady, N. Y.
Lindberg Engineering Co., 2448 West Hubbard, Chicago 12, Ill.
W. S. Rockwell Co., 56 Church St., New York 7, N. Y.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.
Young Brothers Co., 6508 Mack Ave., Detroit 7, Mich.

FURNACES (Malleable Melting)
American Bridge Co., Pittsburgh 19, Pa.
Pittsburgh Lectromelt Furnace Corp., P. O. Box 1125, Pittsburgh, Pa.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

FURNACES (Nonferrous Melting)
Ajax Engineering Corp., Trenton, N. J.
Ajax Metal Co., Philadelphia 23, Pa.
Bellevue Industrial Furnace Co., 2975 Bellevue Ave., Detroit 7, Mich.
Campbell-Hausfeld Co., 300-320 Moore St., Harrison, O.
Dempsey Industrial Furnace Corp., Springfield 5, Mass.
Detroit Electric Furnace Div. of Kuhlman Electric Co., Bay City, Mich.
Fisher Furnace Co., 5535 N. Wolcott Ave., Chicago 40, Ill.
Johnston Mfg. Co., Minneapolis 13, Minn.
W. S. Rockwell Co., 56 Church St., New York 7, N. Y.
Stroman Furnace & Engineering Co., 300 W. Adams St., Chicago 6, Ill.
Swindell-Dressler Corp., Pittsburgh, Pa.

FURNACES (Powdered Coal)
Surface Combustion Co., Toledo, O.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

FURNACES (Steel Melting)
American Bridge Co., Pittsburgh 19, Pa.
Detroit Electric Furnace Div. of Kuhlman Electric Co., Bay City, Mich.
Pittsburgh Lectromelt Furnace Corp., P. O. Box 1125, Pittsburgh, Pa.
Swindell-Dressler Corp., Pittsburgh, Pa.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

FURNACE BLOWERS
Campbell-Hausfeld Co., Harrison, O.
Fisher Furnace Co., 5535 N. Wolcott Ave., Chicago 40, Ill.
Roots-Connersville Blower Corp., Connersville, Ind.

GAGES
Acme Pattern & Tool Co., Inc., 232 N. Findlay St., Dayton 3, O.

GAGGERS
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.

GANNISTER
Firegan Sales Co., 1691 Board of Trade Bldg., Chicago, Ill.
Great Lakes Foundry Sand Co., United Artists Bldg., Detroit 26, Mich.

GAS (Oxygen, Acetylene, Industrial)
Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.
Liquid Carbonic Corp., 3110 S. Kedzie Ave., Chicago 23, Ill.

GAS BURNERS
Elematic Equipment Corp., 6046 So. Wentworth Ave., Chicago 21, Ill.
Fisher Furnace Co., 5535 N. Wolcott Ave., Chicago 40, Ill.
Mahr Mfg. Co., Div. of Diamond Iron Works, Minneapolis, Minn.
North American Mfg. Co., 2910 E. 75th St., Cleveland 4, O.

GLOVES (Industrial, Safety)
American Optical Co., Southbridge, Mass.
Industrial Gloves Co., 203 Garfield Blvd., Danville, Ill.

GOGGLES and EYE PROTECTORS
American Optical Co., Southbridge, Mass.
Chicago Eye Shield Co., 2300 West Warren, Chicago 12, Ill.
Mine Safety Appliances Co., Braddock, Thomas and Meade Sts., Pittsburgh 8, Pa.

GRAPHITE
Bloomsbury Graphite Co., Bloomsbury, N. J.

GRAPHITE (Cont'd.)
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
J. S. McCormick Co., 25th St. & A.V.R.R., Pittsburgh 22, Pa.
National Carbon Co. Inc., Carbon Products Div., Cleveland 1, O.
United States Graphite Co., Saginaw, Mich.

GRINDERS (Electric Portable)
Chicago Pneumatic Tool Co., General Offices: 8 East 44th St., New York 17.
Chicago Wheel & Mfg. Co., Dept. FD, 1101 W. Monroe, Chicago 7, Ill.
Haskins Co., R. G., 615 So. California Ave., Chicago 12, Ill.
Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago, Ill.
Skilsaw Inc., 5033 N. Elston, Chicago 30, Ill.
U. S. Electrical Tool Co., Cincinnati 4, O.

GRINDERS (Flexible Shaft)
Chicago Wheel & Mfg. Co., Dept. FD, 1101 W. Monroe, Chicago 7, Ill.
Haskins Co., R. G., 615 So. California Ave., Chicago 12, Ill.
Mall Tool Co., 7720 South Chicago Ave., Chicago 19, Ill.
N. A. Strand Co., 5001 N. Wolcott Ave., Chicago 40, Ill.

GRINDERS (Pneumatic Portable)
Chicago Pneumatic Tool Co., General Offices: 8 East 44th St., New York 17.
Cleveland Pneumatic Tool Co., 3781 East 77th St., Cleveland 5, O.
Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago, Ill.

GRINDERS (Surface, Bench, Disc Floor)
Chicago Wheel & Mfg. Co., Dept. FD, 1101 W. Monroe, Chicago 7, Ill.
Delta Mfg. Co., Industrial Division, 620 E. Vienna Ave., Milwaukee 1, Wis.
Fox Grinders, Inc., Oliver Bldg., Pittsburgh 22, Pa.
Hammond Machinery Builders, 1605 Douglas Ave., Kalamazoo 54, Mich.
Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago, Ill.
Kling Brothers Engineering Works, 1300 N. Kostner Ave., Chicago 51, Ill.
Mall Tool Co., 7720 South Chicago Ave., Chicago 19, Ill.
Safety Grinding Wheel & Mach. Co., Springfield, O.
Skilsaw Inc., 5033 N. Elston, Chicago 30, Ill.
Standard Electrical Tool Co., 2488 Riverside Ave., Cincinnati, O.
N. A. Strand Co., 5001 N. Wolcott Ave., Chicago 40, Ill.
U. S. Electrical Tool Co., Cincinnati 4, O.

GRINDERS (Swing Frame)
Fox Grinders, Inc., Oliver Bldg., Pittsburgh 22, Pa.
Mall Tool Co., 7720 South Chicago Ave., Chicago 19, Ill.
Safety Grinding Wheel & Mach. Co., Springfield, O.

GRINDING WHEELS—See ABRASIVE WHEELS

GRINDING WHEEL DRESSERS
Carborundum Co., Niagara Falls, N. Y.
Calder Mfg. Co., 628 N. Prince St., Lancaster, Pa.
Chicago Wheel & Mfg. Co., Dept. FD, 1101 W. Monroe, Chicago 7, Ill.
Desmond-Stephan Mfg. Co., Urbana, O.
Simonds Worden White Co., Dayton 7, O.
Western Tool & Mfg. Co., Springfield, O.

GRINDING MACHINERY
Hammond Machinery Builders, 1605 Douglas Ave., Kalamazoo 54, Mich.

GRINDSTONES
Sterling Grinding Wheel Co., Tiffin, O.
Bay State Abrasive Products Co., Westboro, Mass.

GRIT (Abrasive)
Alloy Metal Abrasive Co., Ann Arbor, Mich.
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
American Steel Abrasives Co., Galion, O.

—When writing advertisers, please mention THE FOUNDRY—

Our War is not yet Won!

100% PRODUCTION MUST BE MAINTAINED

CLEANBLAST

"CLEANBLAST" maintains production and consistently reduces cleaning room costs. If you have blast cleaning problems call on us and let us show how we are serving war plants all over the country in the cleaning of castings, forgings, heat treated metal parts, shells, bombs and armor plate.

TEMPERED SHOT AND GRIT

ALLOY METAL ABRASIVE COMPANY

311 W. HURON ST. ANN ARBOR, MICHIGAN

★ ★ NUGENT SAND COMPANY ★ ★

MUSKEGON • MICHIGAN

Miners · Processors · Shippers

1912—1944

Inquiries Solicited

MUSKEGON CORE SANDS

BANK RUN · DRIED · GRADED

Prompt Shipments

SALES AGENTS

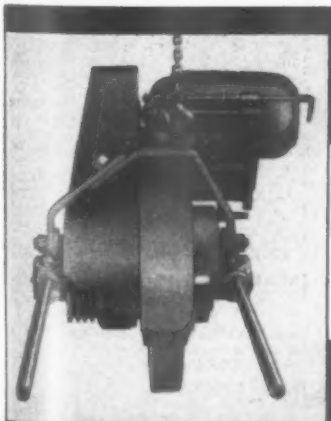
WARNER R. THOMPSON CO.
7328 Hamilton Ave. • Detroit, Mich.
Telephone: Madison 5666

GREAT LAKES FOUNDRY SAND CO.
United Artists Bldg. • Detroit, Mich.
Telephone: Randolph 8700

CARPENTER BROS. CO.
342 No. Water St. • Milwaukee, Wis.
Telephone: Daley 0140

KEENER SAND & CLAY CO.
515 Hartman Building
Columbus, Ohio

QUEEN CITY SAND & SUPPLY CO.
1807 Elmwood Avenue
Buffalo, N. Y.



Perfect Vision

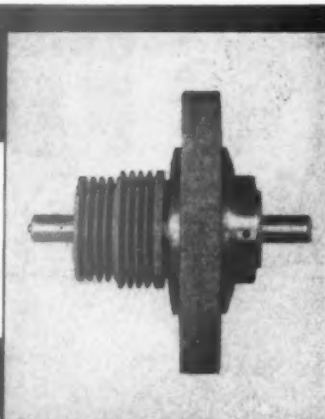
FOX SWING FRAME GRINDERS

Give You Top Grinding Performance

Fox Grinders are built to give you perfect ease of handling at all times, with perfect balance in any position. These smooth running grinders are easy to maneuver and insure better grinding on your castings. Write for the Fox Swing Frame Grinder Bulletin.

FOX GRINDERS, INC.

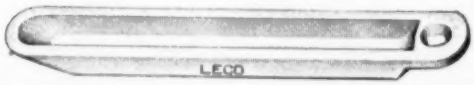
OLIVER BUILDING · PITTSBURGH 22, PA.



Vibration-free Spindle

COMBUSTION BOATS
for the Foundry Laboratory

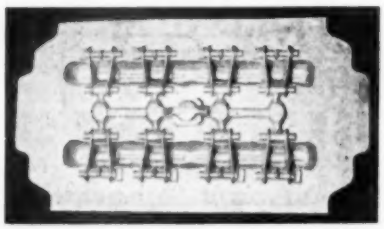
LECO BOAT STYLE NO. 6
3-7/8" Long, 33/64" Wide and 3/8" High
No. 6 Boat



LECO BOAT STYLE NO. 2
3-3/4" Long, 1/2" Wide and 1/4" High

LECO, superior-quality, combustion boats are constructed of the best known high refractory materials, are remarkably *sulphur* and *carbon free* and are designed specifically to withstand thermal shock. These boats are produced in *five special shapes and sizes* to suit your requirements. Immediate delivery is guaranteed in quantities up to 500,000.

LABORATORY EQUIPMENT CORP.
720 E. Main Street Benton Harbor, Mich.
PRECISION CONTROL EQUIPMENT FOR THE LABORATORY



Quality Precision Pressure-Cast Plates
Cope and Drag Plates · Multiple Core Boxes
MANY YEARS EXPERIENCE IN THIS FIELD
Ask for List of Satisfied Customers—Write for Details
PLASTER PROCESS CASTINGS CO.
6922 Carnegie Ave.—Cleveland, O.

CROWN LEATHER
FILLET
FOR BETTER PATTERNS
GREAT FLEXIBILITY—EASY
APPLICATION—FEATHER
EDGE—MORE ADHESION
FORMS A PERFECT RADIUS
CROWN FILLET
Write for information
PAGE BELTING COMPANY
CONCORD, N. H.
Manufacturers Since 1868

WHERE-TO-BUY

GRIT (Abrasive) (Con't.)
Carborundum Co.
Niagara Falls, N. Y.
Globe Steel Abrasive Co.,
Mansfield, O.
Pangborn Corp., Hagerstown, Md.
Pittsburgh Crushed Steel Co.
Pittsburgh 1, Pa.
Simonds Worden White Co.
Dayton 7, O.

HAMMERS (Chipping)
Chicago Mfg. & Distributing Co.
1928 W. 46th St., Chicago 9, Ill.
Chicago Pneumatic Tool Co.,
General Offices: 8 East 44th St.,
New York 17.
Cleveland Pneumatic Tool Co., 3781
East 77th St., Cleveland 5, O.
Independent Pneumatic Tool Co.,
600 W. Jackson Blvd.,
Chicago, Ill.
Master Tool Co., Inc.,
5605 Herman Ave., Cleveland 2, O.
Schramm Inc., West Chester, Pa.

HAMMERS (Rawhide)
Chicago Rawhide Mfg. Co.,
1384 Elston Ave., Chicago 22, Ill.

HAND PADS (Leather)
Chicago Rawhide Mfg. Co.,
1384 Elston Ave., Chicago 22, Ill.
Page Belting Co., Concord, N. H.

HARDNESS TESTING EQUIPMENT
Harry W. Dietert Co., 9330A Roselawn Ave., Detroit 4, Mich.
Riehle Testing Mach. Div.
American Machine & Metals Inc.,
East Moline, Ill.

HEAT CONTROL AND RECORDING DEVICES
Elematic Equipment Corp.,
6046 So. Wentworth Ave.,
Chicago 21, Ill.
Foxboro Company, Foxboro, Mass.
Illinois Testing Laboratories,
418 N. LaSalle St., Chicago 10, Ill.
Lindberg Engineering Co., 2448
West Hubbard, Chicago 12, Ill.
Marshall Co., L. H., 270 W. Lane,
Columbus 1, O.

HEATERS (Direct Fired)
Despatch Oven Co.,
Minneapolis 14, Minn.

HEATERS (Indirect Fired)
Despatch Oven Co.,
Minneapolis 14, Minn.

HEATERS (Gas, Oil, Electric)
American Foundry Equipment Co.,
Mishawaka, Ind.
Despatch Oven Co.,
Minneapolis 14, Minn.
Gehnrich Oven Div.,
W. S. Rockwell Co.,
56 Church St., New York 7, N. Y.

HEATERS (Liquid, Steam)
Johnson Corporation,
Three Rivers, Mich.

HEATERS (Space, Unit, Oven, Water)
American Foundry Equipment Co.,
505 S. Byrkit St., Mishawaka, Ind.
Maehler, Paul Co., 2200 W. Lake
St., Chicago 12, Ill.
Ross, J. O., Engineering Corp.,
350 Madison Ave., New York 17.
B. F. Sturtevant Co.,
Hyde Park, Boston, Mass.

HELMETS (Blasting)
American Foundry Equipment Co.,
505 Byrkit St., Mishawaka, Ind.
American Optical Co.,
Southbridge, Mass.
Pangborn Corp., Hagerstown, Md.
W. W. Sly Mfg. Co.,
4753 Train Ave., Cleveland 2, O.

HELMETS (Welding)
American Optical Co.,
Southbridge, Mass.

HOISTS (Air)
Chicago Pneumatic Tool Co.,
General Offices: 8 East 44th St.,
New York 17.
Curtis Pneumatic Machinery Co.,
1922 Kienlen Ave.,
St. Louis 20, Mo.
Gardner-Denver Co.,
Gardner Drive, Quincy, Ill.
Independent Pneumatic Tool Co.,
600 W. Jackson Blvd.,
Chicago, Ill.

HOISTS (Chain)
Chicago Tramrail Co., 2910 Carroll
Ave., Chicago 12, Ill.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co.,
1155 East 283rd St., Wickliffe, O.
Reading Chain & Block Corp.,
2108 Adams St., Reading, Pa.

HOISTS (Electric)
Chicago Tramrail Co., 2910 Carroll
Ave., Chicago 12, Ill.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co.,
1155 East 283rd St., Wickliffe, O.

HOISTS (Electric) (Cont'd.)
Conco Engineering Works,
Mendota, Ill.
Master Electric Co.,
Dayton 1, Ohio.
Modern Equipment Co., Dept. 199,
Port Washington, Wis.
Reading Chain & Block Corp.,
2108 Adams St., Reading, Pa.
Shepard-Niles Crane & Hoist Corp.,
360 Schuyler Ave.,
Montour Falls, N. Y.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

HOISTS (Hand)
Clipper Mfg. Co., 4030 Manchester,
St. Louis, Mo.

HOSE (Air, Blasting, Water, Gas)
Cleveland Pneumatic Tool Co., 3781
East 77th St., Cleveland 5, O.
Gardner-Denver Co.,
Gardner Drive, Quincy, Ill.
Independent Pneumatic Tool Co.,
600 W. Jackson Blvd.,
Chicago, Ill.
Ingersoll-Rand Co.,
11 Broadway, New York 4, N. Y.
Manhattan Rubber Mfg. Div.
of Raybestos, Manhattan, Inc.,
77 Townsend St., Passaic, N. J.
Pangborn Corp., Hagerstown, Md.
Schramm Inc., West Chester, Pa.

HOSE FITTINGS
Independent Pneumatic Tool Co.,
600 W. Jackson Blvd.,
Chicago, Ill.
New Haven Vibrator Co., 131
Chestnut St., New Haven 7, Conn.

HOSE REELS
Schrader's Son, A., 470 Vanderbilt
Ave., Brooklyn 17, N. Y.

HYDRAULIC CLEANING EQUIPMENT
Hydro-Blast Corp., 2550 N. Western
Ave., Chicago 47, Ill.
Pangborn Corp., Hagerstown, Md.
N. Ransohoff, Inc., 208 W. 71st St.,
Cincinnati 16, O.

ILLUMINATORS (X-Ray Film)
Eastman Kodak Co.,
Rochester, N. Y.
General Electric X-Ray Corp.,
2012 Jackson Blvd.,
Chicago 12, Ill.
Picker X-Ray Corp., 300 Fourth
Ave., New York City 10.

IMPACT TESTING MACHINES
Riehle Testing Mach. Div.,
American Machine & Metals Inc.,
East Moline, Ill.

IMPREGNATING SYSTEMS (Magnesium Castings)
Empire Varnish Co., 2636 E. 76th
St., Cleveland 4, O.
Jackson & Church Co.,
Saginaw, Mich.

INGOT MOLDS
Acme Foundry Co., Detroit 16, Mich.

INGOTS (Nonferrous)
Ajax Metal Co.,
Philadelphia 23, Pa.
Aluminum & Magnesium Inc.,
Sandusky, O.
American Smelting & Refining Co.,
120 Broadway, New York 5.
Apex Smelting Co., Chicago, Ill.
Bohn Aluminum & Brass Corp.,
Detroit 26, Mich.
Cleveland Electro Metals Co.,
W. 38th St. & NP RR.
Cleveland 13, O.
Federated Metals Div.,
American Smelting & Ref. Co.,
New York City 5.
General Smelting Co.,
Philadelphia, Pa.
Greenfield Co., Inc., Samuel,
31 Stone St., Buffalo, N. Y.
International Nickel Co., Inc.,
67 Wall St., New York City 5.
Jobbins, Wm. F., Inc., Aurora, Ill.
Lavin & Sons, R., Inc., Chicago, Ill.
National Smelting Co., Cleveland, O.
Niagara Falls Smelting & Refining
Corp., 2204 Elmwood Ave.,
Buffalo 17, New York.
Silvertein & Pinsof Inc., 1720 N.
Elston, Chicago 22, Ill.
Sonken-Galamba Corp., Kansas
City, Kan.
U. S. Metals Refining Co.,
New York
U. S. Reduction Co.,
E. Chicago, Ind.

INSULATION (Rock Wool)
National Gypsum Co.,
Buffalo 2, N. Y.

INSULATORS (for casting heads)
Houghton Co., E. F.
Philadelphia, Pa.

IRON CEMENT
Smooth-On Mfg. Co., 570 Communipaw Ave., Jersey City 4, N. J.

—When writing advertisers, please mention THE FOUNDRY—

MANHATTAN ABRASIVE WHEELS

Custom-Engineered for Service

Rubber and resinoid bonded—for sustained high-speed operation—MANHATTAN Abrasive Wheels wear evenly, grind accurately.

Designed and engineered with proper specifications for your job. Wheels also for snagging, cutting-off; and resilient wheels for polishing.

For special grinding problems, consult

ABRASIVE WHEEL DEPARTMENT

THE MANHATTAN RUBBER MFG. DIVISION

OF RAYBESTOS-MANHATTAN, INC.

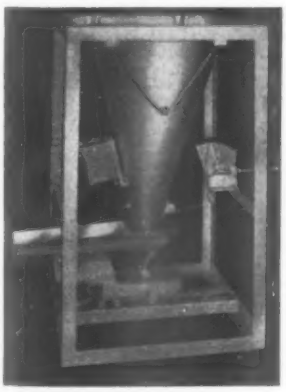
Executive Offices and Factories—77 Townsend St., Passaic, N.J.

The Easy, Economical Method of Feeding Alloys to Ladle Streams—with

SYNTRON

"Vibra-Flow"

DRY FEEDER MACHINES



Complete units, made up with:

"Vibra-Flow" Vibrating Feeders, with rheostat control of rate of flow—and—

Vibrated, non-arching supply hoppers—

Both mounted in a sturdy frame, as illustrated, ready for operation.

Capacities from ounces to tons per hour, by a simple turn of the rheostat knob.

Graphidox and ferrosilicon additions, etc. to foundry iron can be automatically controlled.

Write us, giving the details of your problem

SYNTRON COMPANY

540 Lexington Ave. Homer City, Pa.

WATERLOX

ACCOMPANIES THE ARMED FORCES

On the Land

As a casting sealer in the production of engine blocks, cylinder heads, and crank cases for mechanized equipment. Especially effective under heat, it goes with Army equipment everywhere.

In the Air

Waterlox as a sealer hastened the production of aluminum and magnesium castings for airplane engines. It is used also on valves, regulators and piping to counteract the effects of 100 Octane gasoline. It is especially adapted to impregnating electrical coils and delicate parts of radios as it withstands temperatures of 60° and 70° below zero.

On the Sea

Waterlox is a perfect sealer of the large transmission cases for landing craft. It is used in building engines, distilling units for aircraft carriers, piping which must withstand salt water, water jackets, manifolds, centrifugal pumps and cylinder blocks.

Under the Sea

Waterlox stands up under high pressure. It is a perfect sealer of submarine parts, torpedo shells and mechanisms, mines and pumps. It locks out moisture.

INVESTIGATE WATERLOX FOR YOUR PRODUCTION NEEDS!

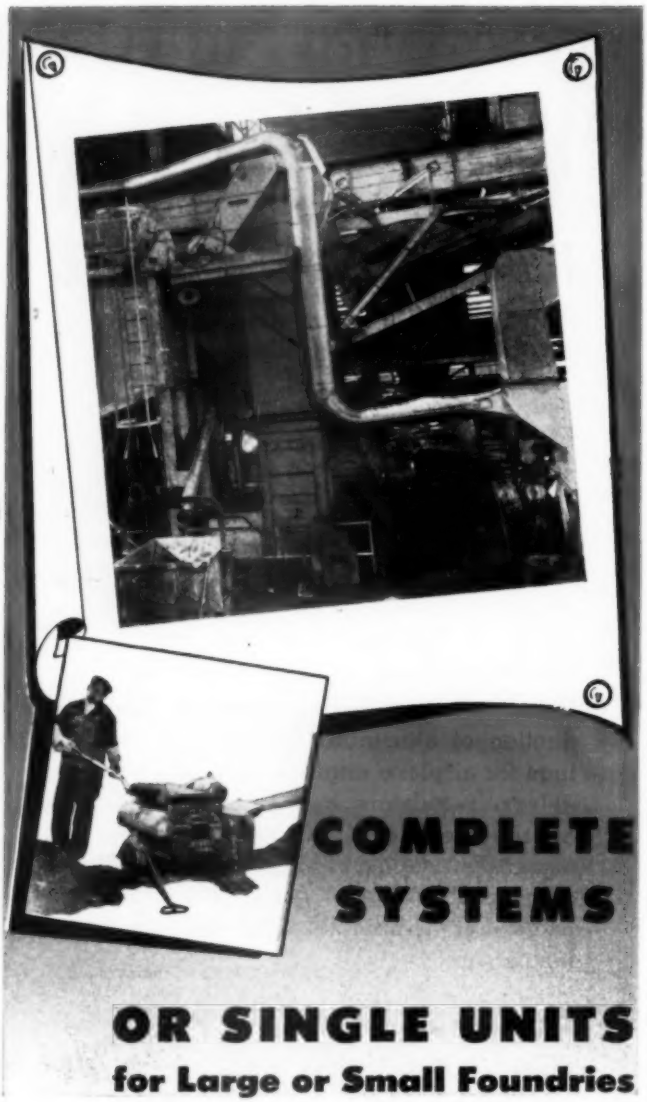
Inquire about Waterlox Maintenance Products, too

WATERLOX

DIVISION OF

THE EMPIRE VARNISH COMPANY

2636 East 76th St. Cleveland, Ohio



COMPLETE SYSTEMS

OR SINGLE UNITS

for Large or Small Foundries

ALUMINUM

BRASS

IRON

STEEL

MAGNESIUM

JEFFREY EXPERIENCED FOUNDRY ENGINEERS ARE AVAILABLE FOR ACCURATE ANALYSIS AND LAYOUT

Sand Handling and Preparation Systems

Mold Handling Systems

Casting Handling Systems

JEFFREY....ESTABLISHED 1877

THE JEFFREY MANUFACTURING COMPANY

907-99 North Fourth St., Columbus 16, Ohio

SALES OFFICES: Baltimore, Birmingham, Boston, Buffalo, Chicago, Cleveland, Cincinnati, Detroit, Denver, Huntington, Huston, Milwaukee, New York, Philadelphia, Pittsburgh, Scranton, St. Louis, Salt Lake City

WHERE-TO-BUY

IRON ORE
Bethlehem Steel Co., Bethlehem, Pa.
Pickands, Mather & Co., Cleveland 14, O.

IRON OXIDES
Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.
Delta Oil Products Co., Milwaukee 9, Wis.
Pollard Oil Products Co., 1627 So. 44th St., Milwaukee 14, Wis.

JACKETS (Mold)
Adams Co., 700 Foster St., Dubuque, Ia.
Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.
Freeman Supply Co., 1152 Broadway, Toledo 5, O.
Fremont Flask Co., Fremont, O.
Hines Mfg. Co., 1324 Hird Ave., Cleveland 7, O.

LABORATORY EQUIPMENT (Chemical)
Buehler, Ltd., 228 N. LaSalle St., Chicago 1, Ill.
General Electric X-Ray Corp., Dept. N 37, 2012 Jackson Blvd., Chicago 12, Ill.
Harry W. Dietert Co., 9330A Roselawn Ave., Detroit 4, Mich.
Laboratory Equipment Corp., Benton Harbor, Mich.

LABORATORY EQUIPMENT (Physical)
Buehler, Ltd., 228 N. LaSalle St., Chicago 1, Ill.
Elematic Equipment Corp., 6046 So. Wentworth Ave., Chicago 21, Ill.
General Electric X-Ray Corp., Dept. N 37, 2012 Jackson Blvd., Chicago 12, Ill.
Harry W. Dietert Co., 9330A Roselawn Ave., Detroit 4, Mich.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Norton Co., Worcester 6, Mass.

LADLES
Bethlehem Steel Co., Bethlehem, Pa.
Industrial Equipment Co., Minster, O.
Modern Equipment Co., Dept. 199 Port Washington, Wis.
Frederic B Stevens, Inc., Detroit 26, Mich.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

LADLE HEATERS
Hauck Mfg. Co., 106 Tenth St., Brooklyn 15, N. Y.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

LATHE CENTERS
Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.

LEAD
American Smelting & Refining Co., 120 Broadway, New York 5.

LIMESTONE
Bethlehem Steel Co., Bethlehem, Pa.

LINSEED OIL
Hercules Powder Co., 999 Market St., Wilmington 99, Del.
Penola Inc., Pittsburgh 1, Pa.

LOADERS
Clearfield Machine Co., Clearfield, Pa.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.

LUBRICANTS (Industrial)
Houghton Co., E. F. Philadelphia, Pa.
Penola Inc., Pittsburgh 1, Pa.
United States Graphite Co., Saginaw, Mich.

LUBRICATORS (Air Line)
Jas. A. Murphy & Co., Hamilton, O.
New Haven Vibrator Co., 131 Chestnut St., New Haven 7, Conn.

LUMBER (All kinds)
Dougherty Lumber Co., 4300 East 68th St., Cleveland 5, O.

MACHINE KEYS
Standard Horse Nail Corp., New Brighton, Pa.

MAGNESIUM (Ingots)
Apex Smelting Co., 2534 Fillmore St., Chicago 12, Ill.

MAGNETS
Dings Magnetic Separator Co., 512 E. Smith St., Milwaukee 7, Wis.
Stearns Magnetic Mfg. Co., 662 S. 28th St., Milwaukee 4, Wis.

MALLETS (Rawhide)
Chicago Rawhide Mfg. Co., 1384 Elston Ave., Chicago 22, Ill.

MANGANESE (Briquets)
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York 17, N. Y.

MATCHPLATES
Acme Pattern & Tool Co., Inc., 232 N. Findlay St., Dayton 3, O.
Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
City Pattern Foundry & Machine Co., 1161 Harper Ave., Detroit 11, Mich.
Hines Mfg. Co., 1324 Hird Ave., Cleveland 7, O.
Plaster Process Castings Co., 6922 Carnegie Ave., Cleveland 3, O.
Scientific Cast Products Corp., 1388-92 E. 40th St., Cleveland 3, O.

MAULS
Chicago Rawhide Mfg. Co., 1384 Elston Ave., Chicago 22, Ill.

MELTING POTS
Acme Foundry Co., Detroit 16, Mich.
Northern Boiler Co., 3453 W. 86th St., Cleveland, O.

METAL CLEANING EQUIPMENT
American Foundry Equipment Co., Mishawaka, Indiana.
N. Ransohoff, Inc., 208 W. 71st St. Cincinnati 16, O.

METAL CUTTING BAND SAWS
Tannewitz Works, Grand Rapids 4 Mich.

METALLIC SPRAYING EQUIPMENT
Metallizing Co. of America, 1330 W. Congress St., Chicago 7, Ill.

METALLOGRAPHIC EQUIPMENT
Buehler, Ltd., 228 N. LaSalle St. Chicago 1, Ill.
General Electric X-Ray Corp., Dept. N 37, 2012 Jackson Blvd., Chicago 12, Ill.
Harry W. Dietert Co., 9330A Roselawn Ave., Detroit 4, Mich.

METALLURGISTS
Chas. C. Kawin Co., 431 So. Dearborn St., Chicago 5, Ill.

METERS (Gas, Air, Water)
Illinois Testing Laboratories, Inc., 420 N. LaSalle St., Chicago 10, Ill.
Roots-Connersville Blower Corp., 302 Madison Ave., Connersville, Ind.

MICROSCOPES
Buehler, Ltd., 228 N. LaSalle Chicago 1, Ill.

MITRE SAW BENCHES
Tannewitz Works, Grand Rapids 4, Mich.

MIXERS (Core Wash)
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.

MIXERS (Sand and Clay)
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Beardsley & Piper Co., The, 2541 N. Keeler Ave., Chicago 39, Ill.
Clearfield Machine Co., Clearfield, Pa.
Construction Machinery Co., Waterloo, Iowa.
Freeman Supply Co., 1152 Broadway Toledo 5, O.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Royer Foundry & Machine Co., Kingston, Pa.

MOLD CONVEYORS
C. O. Bartlett & Snow Co., 6201 Harvard Ave., Cleveland 5, O.
Beardsley & Piper Co., The, 2541 N. Keeler Ave., Chicago 39, Ill.
Chain Belt Co., 1671 W. Bruce St., Milwaukee 4, Wis.
Jeffrey Mfg. Co., 907-99 N. Fourth St., Columbus 16, O.
Link Belt Co., 300 W. Pershing Rd. Chicago 9, Ill.
Logan Company, 580 Cabel, Louisville, Ky.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.

MOLD DRYERS
Despatch Oven Co., Minneapolis 14, Minn.
Hauck Mfg. Co., 106 Tenth St., Brooklyn 15, N. Y.
Kirk & Blum Mfg. Co., 2838 Spring Grove Ave., Cincinnati 25, O.

MOLD OVENS and DRYERS
Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, O.
Despatch Oven Co., Minneapolis, Minn.
Foundry Equipment Co., Cleveland 13, O.
Gehnrich Oven Div., W. S. Rockwell Co., 56 Church S.., New York 7, N. Y.

—When writing advertisers, please mention THE FOUNDRY—

HARD AND UNIFORM!

For tough assignments

AMERICAN
SHOT & GRIT

Just as our magnificent armed forces strike hard and relentlessly for victory, AMERICAN STANDARDIZED STEEL SHOT and EVER-SHARP STEEL GRIT are giving a superbly efficient performance in American foundries today. Manufactured by a distinctive method and heat treatment, each pellet is hard, uniform and takes an equal share of the beating. AMERICAN STEEL ABRASIVES will give you longer service plus greater and more efficient production.

THE AMERICAN STEEL ABRASIVES COMPANY
GALION OHIO

EMPIRE THAT GOOD By-Product Coke:

For Foundry • Metallurgical • Chemical • Water Gas • Domestic Uses

Also special grades for special purposes, such as low ash, low phosphorus, high carbon for carbide manufacture

SHIPPING POINT · HOLT, ALABAMA

PHONE 3-9135

DEBARDELEBEN COAL CORPORATION Transportation Building BIRMINGHAM, ALA.

DeBardeleben Preparation and Service Give Added Value

MAGNESIUM MELTING LADLES . . . ALL STEEL

Sand Blasted, Metalized with Aluminum for 50% Longer Life . . .
95 LB. TO 4000 LB. CAPACITY
Automatically Welded on "Unionmelt"
Prints and Prices on Request

THE NORTHERN BOILER CO.
WEST 86th STREET and BIG FOUR R. R., CLEVELAND, O.

Stop Costly Job Delays - - Use TOUGH CHISELS FOR TOUGH JOBS

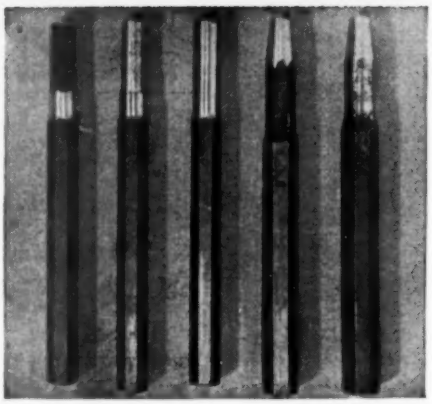
GUARANTEED PERFORMANCE

SCIENTIFICALLY HARDENED

ROCKWELL TESTED

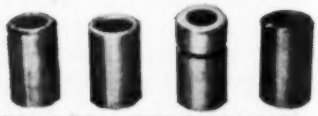
GROUND TO U. S. NAVY STANDARD

Built up to a standard not down to price.



BUSHINGS

Good chisels require good bushings—Steel Conversion Bushings assure longer life, with less wear on the pressure surfaces.



WE FURNISH THE RIGHT CHIPPING TOOL FOR EVERY JOB

For Standard Stock Size Chisels and Bushings, Write Today for Bulletin 100.

STEEL CONVERSION & SUPPLY COMPANY

MILLS UTILITIES S FOUNDRIES

General Offices:

25 WILLOW AVENUE

CASTLE SHANNON, PITTSBURGH, PA.

BRASS FOUNDRIES

Interested in making small brass castings in quantity for eastern manufacturer? Present and post-war market. Write for details and blueprints.

Address Box No. 631

The FOUNDRY, Penton Bldg., Cleveland 13, Ohio

PYRO THE SIMPLIFIED OPTICAL PYROMETER

HERE'S A HOT ONE!

A 3 lb., self-contained, DIRECT-READING simplified optical pyrometer that gives the TRUE SPOUT AND POURING TEMPERATURES OF MOLTEN IRON AND STEEL MEASURED IN THE OPEN! That's what the PYRO does! No upkeep, no accessories—and it quickly pays for itself. Don't swear AT other pyrometers; get a PYRO and swear BY it. For NON-FERROUS foundry, use PYRO IMMERSION PYROMETER. Write for catalogs describing ranges and types.

THE PYROMETER INSTRUMENT CO.

Plant & Lab.:

106 Lafayette St., New York 13, N. Y.

WHERE-TO-BUY

MOLD OVENS & DRYERS (Cont'd)

Lanly Company, 750 Prospect Ave., Cleveland 15, O.
Liquid Carbonic Corp., 3110 S. Kedzie Ave., Chicago, Ill.
Maehler, Paul, Co., 2200 W. Lake St., Chicago 12, Ill.
Mahr Mfg. Co., Div. of Diamond Iron Works, Minneapolis, Minn.

MOLDERS BENCHES

Western Tool & Mfg. Co., Springfield, O.

MOLDING MACHINES

Adams Co., 700 Foster St., Dubuque, Iowa.
Arcade Manufacturing Co., Freeport, Ill.
Beardsley & Piper Co., The, 2541 N. Keeler Ave., Chicago 39, Ill.
Berkshire Mfg. Co., 1111 Power Ave., Cleveland 14, O.
Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Davenport Machine & Foundry Co., Davenport, Iowa.
Grimes Molding Machine Co., 1429 Virginia Park, Detroit 6, Mich.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
International Molding Machine Co., 2608 W. 16th St., Chicago 8, Ill.
Johnston & Jennings Co., 867 Addison Rd., Cleveland 14, O.
Milwaukee Foundry Equipment Co., 3238 W. Pearce St., Milwaukee 4, Wis.
Wm. H. Nicholls Co., Richmond Hill, Long Island 18, N. Y.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
Pioneer Mfg. Co., West Allis, Wis.
S P O Incorporated, 7500 Grand Division Ave., Cleveland 5, O.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.

MOLDING MACHINES (Jolt)

Adams Co., 700 Foster St., Dubuque, Iowa.
Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Davenport Machine & Foundry Co., Davenport, Iowa.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
International Molding Machine Co., 2608 W. 16th St., Chicago 8, Ill.
Johnston & Jennings Co., 867 Addison Rd., Cleveland 14, O.
Milwaukee Foundry Equipment Co., 3238 W. Pearce St., Milwaukee 4, Wis.
Wm. H. Nicholls Co., Richmond Hill, Long Island 18, N. Y.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
S P O Incorporated, 7500 Grand Division Ave., Cleveland 5, O.

MOLDING MACHINES (Rollover)

Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Davenport Machine & Foundry Co., Davenport, Iowa.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
International Molding Machine Co., 2608 W. 16th St., Chicago 8, Ill.
Johnston & Jennings Co., 867 Addison Rd., Cleveland 14, O.
Milwaukee Foundry Equipment Co., 3238 W. Pearce St., Milwaukee 4, Wis.
Wm. H. Nicholls Co., Richmond Hill, Long Island 18, N. Y.
Osborn Mfg. Co. 5401 Hamilton Ave., Cleveland 14, O.
S P O Incorporated, 7500 Grand Division Ave., Cleveland 5, O.

MOLDING MACHINES (Squeeze)

Acme Pattern & Tool Co., Inc., 232 N. Findlay St., Dayton 3, O.
Adams Co., 700 Foster St., Dubuque, Iowa.
Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Davenport Machine & Foundry Co., Davenport, Iowa.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
International Molding Machine Co., 2608 W. 16th St., Chicago 8, Ill.
Johnston & Jennings Co., 867 Addison Rd., Cleveland 14, O.
Milwaukee Foundry Equipment Co., 3238 W. Pearce St., Milwaukee 4, Wis.
Wm. H. Nicholls Co., Richmond Hill, Long Island 18, N. Y.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
S P O Incorporated, 7500 Grand Division Ave., Cleveland 5, O.

MOLDING SANDS

Great Lakes Foundry Sand Co., United Artists Bldg., Detroit 26, Mich.
Ottawa Silica Co., Ottawa, Ill.
Standard Silica Corp., 209 So. LaSalle St., Chicago 4, Ill.

MOLD WASH

Dayton Oil Co., Dayton 1, O.
Delta Oil Products Co., Milwaukee 9, Wis.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
National Carbon Co. Inc., Carbon Products Div., Cleveland 1, Ohio.
Pollard Oil Products Co., 1627 So. 44th St., Milwaukee 14, Wis.
United States Graphite Co., Saginaw, Mich.

MOLDS (Centrifugal, Graphite)

National Carbon Co. Inc., Carbon Products Div., Cleveland 1, Ohio.

MOLYBDENUM

Molybdenum Corporation of America, Pittsburgh 19, Pa.

MONORAIL SYSTEMS

American Monorail Co., 13104 Athens Ave., Cleveland 7, O.
Chicago Tramrail Co., 2910 Carroll Ave., Chicago 12, Ill.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., 1155 East 283rd St., Wickliffe, O.
Modern Equipment Co., Dept. 199, Port Washington, Wis.

MOTOR CONTROL

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

MOTORS (Electric)

Master Electric Co., Dayton 1, O.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

NAILS (Chill)

Bethlehem Steel Co., Bethlehem, Pa.
Capewell Mfg. Co., Hartford, Conn.
Republic Steel Corp., Cleveland 4, O.
Standard Horse Nail Corp., New Brighton, Pa.

NICKEL

International Nickel Co. Inc., 67 Wall St., New York City 5.

NOZZLES (Blasting)

American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Davenport Machine & Foundry Co., Davenport, Iowa.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Great Lakes Foundry Sand Co., United Artists Bldg., Detroit 26, Mich.
Norton Co., Worcester 6, Mass.
Pangborn Corp., Hagerstown, Md.
W. W. Sly Mfg. Co., 4753 Train Ave., Cleveland 2, O.

OIL BURNERS

Fisher Furnace Co., 5535 N. Wolcott Ave., Chicago 40, Ill.
Stroman Furnace & Engineering Co., Div. of Peterson Oven Co., 300 W. Adams St., Chicago 6, Ill.
North American Mfg. Co., 2910 E. 75th St., Cleveland 4, O.

OPTICAL PYROMETERS

Buehler, Ltd., 228 N. LaSalle St., Chicago 1, Ill.

OVENS (Annealing and Heat Treating)

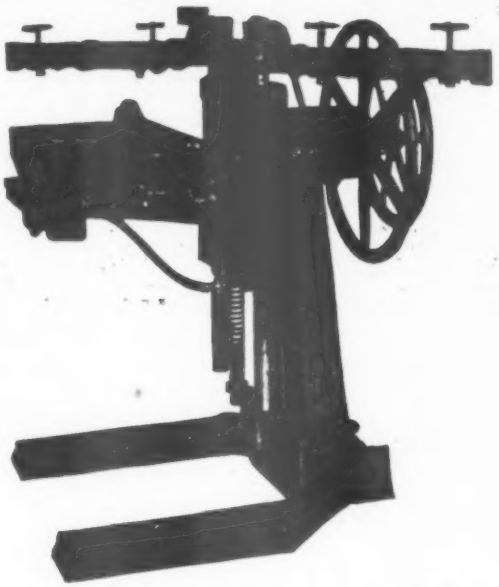
Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, O.
Despatch Oven Co., Minneapolis 14, Minn.
Electric Furnace Co., Salem, O.
Foundry Equipment Co., Cleveland 13, O.
Gennrich Oven Div., W. S. Rockwell Co., 56 Church St., New York 7, N. Y.
Lindberg Engineering Co., 2448 West Hubbard, Chicago 12, Ill.
Maehler, Paul, Co., 2200 W. Lake St., Chicago 12, Ill.
Mahr Mfg. Co., Div. of Diamond Iron Works, Minneapolis, Minn.
Peters-Dalton Inc., 628 E. Forest Ave., Detroit 1, Mich.
Ross, J. O., Engineering Corp., 350 Madison Ave., New York 17.
Whiting Corporation, 15607 Lathrup Ave., Harvey, Ill.
Young Brothers Co., 6508 Mack Ave., Detroit 7, Mich.

OVENS (Core) (See CORE OVENS)

—When writing advertisers, please mention THE FOUNDRY*—*

MODEL C-414

for Magnesium Molding



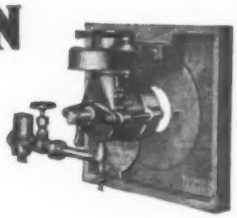
The machine illustrated is the Model C-414 in pattern drawn position. Capacity of flasks 36 x 46. This machine is being widely used for the accelerated magnesium castings production.

Write for Details . . . Also Ask About Our
SAND MIXERS, CORE OVENS, WEIGHING and METERING EQUIPMENT

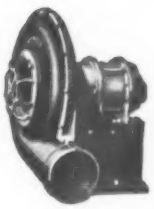
GRIMES MOLDING MACHINE COMPANY
1429 Virginia Park Detroit 6, Mich.

JOHNSTON

BURNERS
OIL and GAS
"REVERSE BLAST"
Mixes ALL the Fuel with ALL the Air



BLOWERS
LOW PRESSURE
DIRECT CONNECTED
Simple, Efficient, Compact, Dependable



Various sizes available for Furnaces, Cupolas and Core Ovens.

FURNACES
for Forging, Heat Treating, Soft Metal Melting.

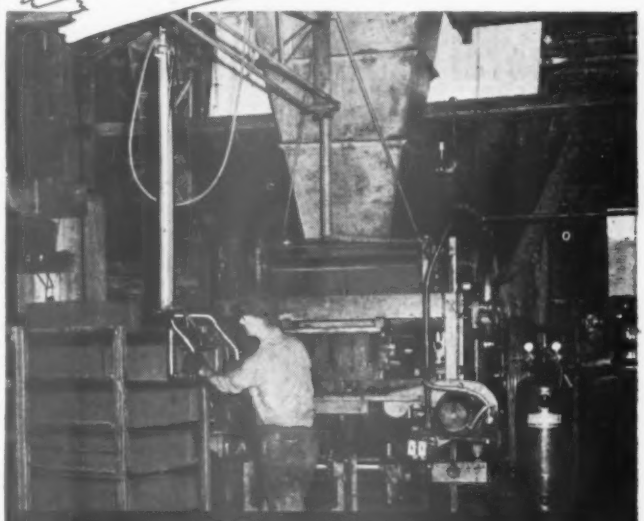
LADLE HEATERS
TORCHES VACUUM TYPE
CONTROLLERS VALVELESS AUTOMATIC

SAFETY THE JOHNSTON LINE DEPENDABILITY

Complete details on request.

JOHNSTON MANUFACTURING COMPANY
2825 EAST HENNEPIN AVENUE · MINNEAPOLIS 13, MINNESOTA

Reduce Handling Costs -Speed Production



with **CURTIS AIR HOISTS**

Illustrated above is an application of a Curtis Air Hoist used to off-bear concrete blocks. In hundreds of other uses, for any lifting operation, Curtis "One-Man"—or "One-Woman"—Air Powered Hoists provide faster, more accurate lifting; they release men for other jobs, reduce worker fatigue, and save time and money.

Having less dead weight than other types of power hoists, Curtis Air Hoists permit light supports and easier moving of trolley mounted models. They are immune to overloads and can be operated by any man or woman in your plant. Faster, yet little more expensive than a chain block.

Curtis Air Hoists are available in capacities up to 10 tons—pendant or bracketed types. For suggestions as to how Curtis Air Hoists can speed up your production and lower your handling costs, write for full information and for free, handy booklet, "How Air Is Being Used in Your Industry."

CURTIS
ST. LOUIS • NEW YORK • CHICAGO • SAN FRANCISCO • PORTLAND

CURTIS PNEUMATIC MACHINERY DIVISION
of Curtis Manufacturing Company
1922 Kienlen Avenue, St. Louis 20, Missouri

Please send me booklet, "How Air Is Being Used in Your Industry."

Name.....
Firm.....
Street.....
City..... State.....

One Week to 10 Days

IMMEDIATE DELIVERY

General Centrifugal Blowers

Designed for GAS *and* OIL BURNERS, CORE *and* ANNEALING OVENS, CUPOLAS *and* CRUCIBLE FURNACES

★

Gas Boosters

★

Cupola Blowers

WIDE RANGE OF SIZES FOR EVERY REQUIREMENT

★

Send for NEW 8-Page Bulletin CB-101

GENERAL BLOWER COMPANY

406 N. PEORIA ST. • CANAL 6340 • CHICAGO 22, ILL.

120 Liberty St. New York 6, N. Y. — 7644 Woodward Ave. Detroit 2, Michigan — 1084 Lakeland Ave. Cleveland 7, O.

Fifth-Grant Bldg. Pittsburgh 19, Pa. — 148 North Fourth St. Philadelphia 6, Pa.

Our facilities fully devoted to PRODUCTION of PRECISION PATTERN WORK

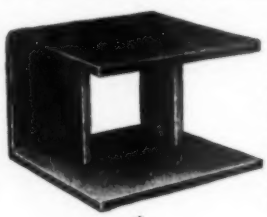
Wood and Metal

HARDWOOD DIES . DIE TEMPLATES

ELKHART PATTERN WORKS

1324 PRINCETON BLVD. Ph 978 ELKHART, IND.

CHAPLETS



The Buffalo "DOUBLE ANGLE" chaplet is a strong, well made single piece, is carefully tinned, fuses readily and does not chill. Four different gauges for light, medium and heavy work. Write for complete information on our full line of chaplets. Samples and prices gladly sent.

"DOUBLE ANGLE"

COMBINED SUPPLY & EQUIPMENT CO.

215 CHANDLER STREET, BUFFALO, NEW YORK

WHERE-TO-BUY

OVENS (Enameling, Japanning)

Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, O.
Despatch Oven Co., Minneapolis 14, Minn.
Electric Furnace Co., Salem, O.
Gehnrich Oven Div., W. S. Rockwell Co., 56 Church St., New York 7, N. Y.
Industrial Oven Engineering Co., 11621 Detroit Ave., Cleveland, O.
Maehler, Paul, Co., 2200 W. Lake St., Chicago 12, Ill.
R. C. Mahon Co., 8650 Mt. Elliott Ave., Detroit 11, Mich.
Peters-Dalton Inc., 608 E. Forest Ave., Detroit 1, Mich.
Porbeck Mfg. Co., 2600 N. 9th St., St. Louis, Mo.
Ross, J. O., Engineering Corp., 350 Madison Ave., New York 17.
Young Brothers Co., 6508 Mack Ave., Detroit 7, Mich.

OVENS (Mold)

Despatch Oven Co., Minneapolis 14, Minn.
Gehnrich Oven Div., W. S. Rockwell Co., 56 Church St., New York 7, N. Y.
Kirk & Blum Mfg. Co., 2838 Spring Grove Ave., Cincinnati 25, O.

OXYGEN

Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.

PARTING COMPOUNDS

Buckeye Products Co., 7022 Vine St., Cincinnati 16, O.
Delta Oil Products Co., Milwaukee 9, Wis.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Houghton Co., E. F., 303 West Lehigh Ave., Philadelphia 33, Pa.
Midwest Foundry Supply Co., Edwardsville, Ill.
National Gypsum Co., Buffalo 2, N. Y.
Smith Facing & Supply Co., 1857 Carter Rd., Cleveland 13, O.
Frederic B. Stevens, Inc., Detroit 26, Mich.

PATTERN COATINGS

McDougall-Butler Co., Buffalo, N. Y.

PATTERN COATING (Rubber)

Foundry Rubber Compounds Corp., 1050 Thirtieth St., N. W., Washington 7, D. C.

PATTERN LETTERS

Freeman Supply Co., Toledo 5, O.

PATTERN LUMBER

Dougherty Lumber Co., Cleveland, 5, O.
Freeman Supply Co., Toledo 5, O.

PATTERN PLATES

Acme Pattern & Tool Co., Inc., 232 N. Findlay St., Dayton 3, O.
Buffalo Pattern Works, 830 Hertel Ave., Buffalo, N. Y.
City Pattern Foundry & Machine Co., 1161 Harper Ave., Detroit 11, Mich.
Freeman Supply Co., Toledo 5, O.
Hines Mfg. Co., 1324 Hird Ave., Cleveland 7, O.
Marathon Chemical Co., Div., Marathon Corp., Rothschild, Wis.
Moltrup Steel Products, Beaver Falls, Pa.
Plaster Process Castings Co., 6922 Carnegie Ave., Cleveland 3, O.
Scientific Cast Products Corp., 1388-92 E. 40th St., Cleveland 3, O.

PATTERN PLATE STOCK

Freeman Supply Co., 1152 Broadway, Toledo 5, O.
Marathon Corp., Rothschild, Wis.

PATTERN SHOP EQUIPMENT

Chicago Wheel & Mfg. Co., Dept. FD, 1101 W. Monroe, Chicago 7, Ill.
Delta Mfg. Co., Industrial Division 620 E. Vienna Ave., Milwaukee 1, Wis.
Do All Div., Continental Machines Inc., Des Plaines, Ill.
Freeman Supply Co., Toledo 5, O.
Oliver Machinery Company, Grand Rapids 2, Mich.
N. A. Strand Co., 5001 N. Wolcott Ave., Chicago 40, Ill.
Skilsaw Inc., 5033 N. Elston, Chicago 30, Ill.

PATTERN SHOP SUPPLIES

Chicago Wheel & Mfg. Co., Dept. FD. 1101 W. Monroe, Chicago 7, Ill.

PATTERNS (Wood, Metal)

Acme Pattern & Tool Co., Inc., 232 N. Findlay St., Dayton 3, O.
Buffalo Pattern Works, 830 Hertel Ave., Buffalo, N. Y.
Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
City Pattern Foundry & Machine Co., 1161 Harper Ave., Detroit 11, Mich.
Elkhart Pattern Works, Elkhart, Ind.
Hines Mfg. Co., 1324 Hird Ave., Cleveland 7, O.
S P O Incorporated, 7500 Grand Division Ave., Cleveland 5, O.

PETROLEUM COKE

Republic Coal & Coke Co., 8 S. Michigan Ave., Chicago 3, Ill.

PHOTOGRAPHIC EQUIPMENT

Eastman Kodak Co., Rochester, N. Y.
General Electric X-Ray Corp., Dept. N 37, 2012 Jackson Blvd., Chicago 12, Ill.

PHOTOGRAPHY (Industrial)

Eastman Kodak Co., Rochester, N. Y.

PIG IRON

Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh, Pa.
E. & G. Brooke Iron Co., Birdsboro, Pa.
Globe Iron Co., Jackson, O.
Hanna Furnace Co., Div. of National Steel Corp. Ecorse, Detroit 18, Mich.
Hickman-Williams & Co., Cleveland 14, O.
Pickands, Mather & Co., Cleveland 14, O.
Republic Steel Corporation, Cleveland 14, O.
Tonawanda Iron Corp., North Tonawanda, N. Y.
Woodward Iron Co., Woodward, Ala.

PIG IRON (Silvery)

Bethlehem Steel Co., Bethlehem, Pa.
Globe Iron Co., Jackson, O.
Hanna Furnace Co., Div. of National Steel Corp., Ecorse, Detroit 18, Mich.
Jackson Iron & Steel Co., Jackson, O.

PINS (Flask)

Hines Mfg. Co., 1324 Hird Ave., Cleveland 7, O.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.
Truscon Steel Co., Youngstown 1, O.

PISTON RINGS (for Molding Machines, Compressors, etc.)

Wm. H. Nicholls Co., Richmond Hill, Long Island 18, N. Y.

PLATES (Bottom)

Adams Co., 700 Foster S., Dubuque, Iowa.
Moltrup Steel Products, Beaver Falls, Pa.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.

PLATES (Core Drying)

Champion Foundry & Machine Co., 1314 W. 21st S., Chicago 8, Ill.
Johns-Manville 22 East 40th St., New York City 16.

PLUMBAGO

Bloomsbury Graphite Co., Bloomsbury, N. J.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
J. S. McCormick Co., 25th St. & A. V. R. R., Pittsburgh 22, Pa.
Frederic B. Stevens, Inc., Detroit 26, Mich.
United States Graphite Co., Saginaw, Mich.

PNEUMATIC TOOLS

Chicago Pneumatic Tool Co., General Offices: 8 East 44th St., New York 17, N. Y.
Cleveland Pneumatic Tool Co., 3781 East 77th St., Cleveland 5, O.
Gardner-Denver Co., Gardner Drive, Quincy, Ill.
Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.

—When writing advertisers, please mention THE FOUNDRY—

A "Star" Performance!

IN SNAGGING CASTINGS

"STARALOX" Resinoid Bonded snagging wheels are busily engaged in turning out "Star Performances" in many foundries today. They are proving their worth to foundrymen by withstanding this grueling, tough, grinding operation in top form and in keeping up production records on all snagging jobs. DETROIT-STAR has been producing grinding wheels of controlled, uniform structure for more than a half a century and our abrasive engineers are ready to consult with you on your snagging problems. There is a "STARALOX" Resinoid wheel for your foundry of the correct size and grade. Write now for complete information.

GRINDING WHEELS FOR EVERY FOUNDRY PURPOSE

Representatives in all Leading Foundry Centers

DETROIT-STAR GRINDING WHEEL CO.
DETROIT 9, MICHIGAN

THE FAST, RUGGED HOIST FOR STEADY WARTIME SERVICE

SPEEDMASTER

Here's why—Few moving parts plus simple design keep Speedmaster maintenance down. With sturdy construction, Master gear head motor, worm gear bathed in oil, antifriction bearings throughout, the Speedmaster is built to take tough wartime service. Speedmaster runs fast, stops quick and holds tight. Fourteen models and speeds to 60 feet per minute to meet a wide range of application.

Write or wire—To get the latest Speedmaster literature and the name of your nearby Master Representative, write or wire us today.

THE **MASTER** ELECTRIC COMPANY
INDUSTRIAL EQUIPMENT DIV. – DAYTON, O.

If you decide

to build
a new foundry
or rebuild
an old foundry—
let CONOVER
check the steps
and submit a plan.

Our experienced engineers will:

1. Check existing conditions.
2. Analyze your requirements.
3. Make complete recommendations for building business at decreased cost — increased productivity.

Conover Engineering Co.
O. D. CONOVER, *Consulting Engineer*
1740 East 12th St. Cleveland 14, Ohio MAin 8772

Protect your Castings

Save MAKE-OVER LABOR AND MONEY

Use CLEVELAND CHAPLETS to prevent casting rejects which result from failure in core support. They have been famous for dependability for more than 54 years.

Cleveland Chaplets are made in Stem, Double-Head, Patented Coil Head and Square Head types.

CLEVELAND CHAPLET & MFG. CO.
W. 67th St. & N. Y. C. Ry.
CLEVELAND, OHIO

Get Dependable Core Support with Cleveland CHAPLETS

POLLY BRAND

POLLY
HI-TEMP COTE
(HIGH TEMPERATURE)
CORE & MOLD WASH
AA-1
FOUNDRY
NECESSITY
Prove This With Trial Drum

POLLARD
OIL PRODUCTS COMPANY
1627 SOUTH 44th ST. MILWAUKEE, WIS.

ENGINEERING SERVICE

FOUNDRY PLANT LAYOUTS
RECONVERSION OF PLANT
APPRAISALS & SURVEYS
DISPOSAL SURPLUS PLANT

WALTER GIELE CO.
Engineers . . . Foundry Specialists
FIRST NATIONAL BANK BUILDING · LEBANON, PENNA.
TELEPHONE LEBANON 1200

WHERE-TO-BUY

PNEUMATIC TOOLS (Cont'd.)
Master Tool Co., Inc.
5605 Herman Ave., Cleveland 2, O.
Schramm Inc., West Chester, Pa.

POLISHING MACHINERY
Chicago Wheel & Mfg. Co., Dept. ED, 101 W. Monroe, Chicago 7, Ill.
Hammond Machinery Builders, 1605 Douglas Ave., Kalamazoo 54, Mich.
N. A. Strand Co., 5001 N. Wolcott Ave., Chicago 40, Ill.

POURING DEVICES
Modern Equipment Co., Dept. 199, Port Washington, Wis.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

POWDERED COAL EQUIPMENT
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

PRESSER BOARDS
Adams Co., 760 Foster St., Dubuque, Iowa.

PRESSURE CASTING SEALER
Empire Varnish Co., 2636 E. 76th St., Cleveland 4, O.

PROTECTIVE MATERIALS (X-Ray)
General Electric X-Ray Corp., 2012 Jackson Blvd., Chicago 12, Ill.
Picker X-Ray Corp., 300 Fourth Ave., New York City 10.

PULLEYS (Magnetic)
Dings Magnetic Separator Co., 512 E. Smith St., Milwaukee 7, Wis.
Stearns Magnetic Mfg. Co., 662 S. 28th St., Milwaukee 4, Wis.

PUMPS
Gardner-Denver Co., Gardner Drive, Quincy, Ill.
Construction Machinery Co., Waterloo, Iowa.
Worthington Pump & Machy. Corp., Harrison, N. J.

PUMPS (Dry, Vacuum)
Fuller Company, Catasaqua, Pa.

PURIFIERS
Cleveland Flux Co., 1026 Main St., Cleveland 13, O.

PUSH-OFF MACHINES
Champion Foundry & Machine Co., 1314 West 21st St., Chicago 8, Ill.
International Molding Machine Co., 2608 W. 16th St., Chicago 8, Ill.
Milwaukee Foundry Equipment Co., 532 W. Pierce St., Milwaukee 4, Wis.

PYROMETERS
Harry W. Dietert Co., 9330A Roselawn Ave., Detroit 4, Mich.
Elematic Equipment Corp., 6064 So. Wentworth Ave., Chicago 21, Ill.
Illinois Testing Laboratories, Inc., 420 N. Lasalle St., Chicago 10, Ill.
Marshall Co., L. H., 270 W. Lane, Columbus 1, O.
Pyrometer Instrument Co., 106 Lafayette St., New York 13.

RADIOGRAPHY (Industrial)
Canadian Radium & Uranium Corp. 630 Fifth Ave., New York City 20
Eastman Kodak Co., Rochester, N. Y.
Radium Chemical Co., Inc., 570 Lexington Ave., New York 22, N. Y.

RADIUM
Canadian Radium & Uranium Corp., 630 Fifth Ave., New York City 20.
Radium Chemical Co., Inc., 570 Lexington Ave., New York 22, N. Y.

RAMMERS
Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago, Ill.
Master Tool Co., Inc., 5605 Herman Ave., Cleveland 2, O.

REFRACTORIES
Carborundum Co., Niagara Falls, N. Y.

REFRACTORIES (Cont'd.)
Cleveland Quarries Co., Cleveland 15, O.
Eastern Clay Products, Inc., Elfort, O.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Firegan Sales Co., 1691 Board of Trade Bldg., Chicago, Ill.
Fisher Furnace Co., 5535 N. Wolcott Ave., Chicago 40, Ill.
Ironton Fire Brick Co., Ironton, O.
Mexico Refractories Co., Mexico, Mo.
Norton Co., Worcester 6, Mass.
Titanium Alloy Mfg. Co., Niagara Falls, N. Y.
United States Graphite Co., Saginaw, Mich.

REGULATORS (Pressure)
Liquid Carbonic Corp., 3110 S. Kedzie Ave., Chicago 23, Ill.

REPAIR PARTS (Molding Machine)
Pioneer Mfg. Co., West Allis, Wis.

RESPIRATORS
Chicago Eye Shield Co., 2300 West Warren, Chicago 12, Ill.
Firegan Sales Co., 1691 Board of Trade Bldg., Chicago, Ill.
Mine Safety Appliances Co., Braddock, Thomas and Meade Sts., Pittsburgh 8, Pa.

RIDDLES
Buffalo Wire Works, 425 Terrace, Buffalo 2, N. Y.
Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis Sts., Philadelphia 24, Pa.

RIDDLES (Electric)
Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Foundry Supplies & Mfg. Co., 2221 Ormand St., Chicago 14, Ill.
Great Western Mfg. Co., Leavenworth, Kans.

RIDDLES (Hand)
Buffalo Wire Works Co., 425 Terrace, Buffalo 2, N. Y.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.

RIDDLE BOTTOMS (Gyratory)
Buffalo Wire Works Co., 425 Terrace, Buffalo 2, N. Y.

RISER RODS (Graphite)
National Carbon Co. Inc., Carbon Products Div., Cleveland 1, O.

RODS (Steel)
Republic Steel Corp., Cleveland 4, O.

ROD STRAIGHTENERS
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.

ROLLER-HEARTH FURNACES (Electric Annealing)
General Electric Co., Schenectady, N. Y.

RUBBER LINING MATERIAL (Abrasive Resisting)
Pangborn Corp., Hagerstown, Md.

RUST PREVENTATIVES
Houghton Co., E. F., 303 West Lehigh Ave., Philadelphia 33, Pa.
Penola Inc., Pittsburgh 1, Pa.

SAFETY CLOTHING
American Optical Co., Southbridge, Mass.
Mine Safety Appliances Co., Braddock, Thomas and Meade Sts., Pittsburgh 8, Pa.

SALT and SALT TABLETS
Mine Safety Appliances Co., Braddock, Thomas and Meade Sts., Pittsburgh 8, Pa.
Morton Salt Co., 310 So. Michigan Ave., Chicago, Ill.

SANDS (Core, Molding, Blasting)
Great Lakes Foundry Sand Co., United Artists Bldg., Detroit 26, Mich.
Midwest Foundry Supply Co., Edwardsville, Ill.

—When writing advertisers, please mention THE FOUNDRY*—*

with Mall CONSTANT HIGH-SPEED **GRINDERS**

The most efficient and useful, all 'round machine any plant or shop could own. Rated motor speed of 1750 r.p.m. is stepped up to 4250 r.p.m. by Geared Head.

Operates 6 quickly interchangeable attachments for Grinding, Wire Brushing, Disc Sanding, Polishing, Buffing and Drilling.

Easily wheeled over smooth or rough flooring right up to the work, saving material handling.

Plugs into any regular electrical outlet and operates independently of all other tools.

Ball bearing equipped straight and angle spindles assure smoother, easier performance and longer service.

ARMY E NAVY

Light-weight working tools minimize fatigue.

Ask Your Supplier or Write for Catalog

MALL TOOL COMPANY

7720 SOUTH CHICAGO AVE., CHICAGO 19, ILLINOIS

Buckeye Silica Firestone

Sawed or Split

—a natural rock for LINING—

Soaking Pits . . . Blast Furnace Ladles
Bessemer Converters . . . Mixers
Grey Iron Cupolas
Foundry Crane Ladles
Air Furnaces . . . Drop Forge Bottoms
Acid Pickling Tanks

LASTS LONGER COSTS LESS

Write for Literature

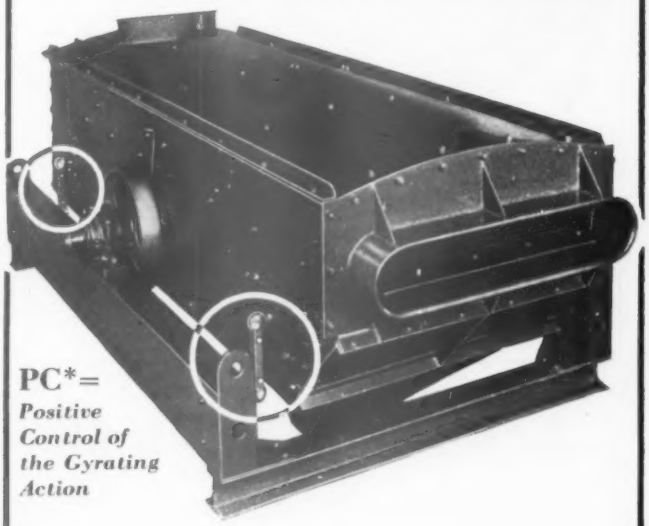
The Cleveland Quarries Co.

1125 Builders Exchange Building
Cleveland, Ohio

SECO

The Right Vibrating Screen

for SAND RECONDITIONING



PC*= *Positive Control of the Gyrating Action*

Renews More Dirty Sand Per Hour for Foundries

● With a Seco, sand is quickly and thoroughly screened and dirt and foreign matter is removed no matter how the load is distributed over the screen. That's because Seco's PC* provides 100% uniformly efficient surface action under all load conditions. The smooth operation of a Seco reduces blinding and keeps the load moving. Dependable Seco vibrating screens are in use in many leading foundries.

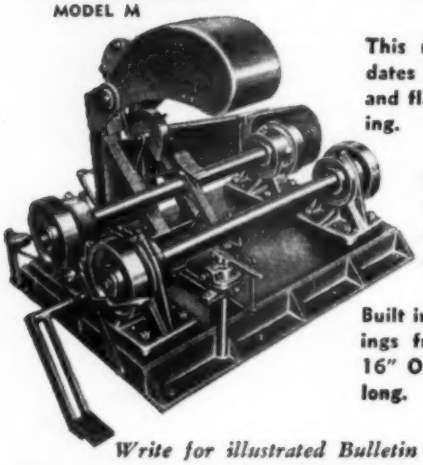
● Seco Patented Auxiliary Vibrator—Here is the answer to the problem of screening damp, sticky sand. May be attached to any Seco model. Write for free illustrated booklet. Write Dept. G.

SECO **SCREEN EQUIPMENT CO., INC.**
9 Lafayette Avenue, Buffalo 13, N. Y.

HORIZONTAL CENTRIFUGAL CASTING MACHINE

TO PRODUCE FERROUS and NON-FERROUS CASTINGS

MODEL M



This machine accommodates both metal molds and flasks for sand molding.

Continuously variable speed control using standard AC power.

Built in six sizes for castings from 1½" O.D. to 16" O.D. and up to 48" long.

Write for illustrated Bulletin No. 443

CENTRIFUGAL CASTING MACHINE CO. P. O. BOX 947 TULSA, OKLA.

A. A. WICKLAND & CO.

Foundry Engineers

Continuously Since 1919

~

Designers of modern foundries and manufacturing plants.

Complete engineering service.

Clients of national prominence will attest to our ability.

ENGINEERING BUILDING · CHICAGO

Telephone Dearborn 9344

for ACCURATE casting duplication

Single or Multiple Section Matchplates from Single Master Pattern.

Cast under Pressure in Plaster Molds.

Cope and Drag Plates.

Multiple Core Boxes.

Precision Castings.

SCIENTIFIC MATCH PLATES Pressure Cast

The SCIENTIFIC CAST PRODUCTS Corp.

1398-1398 E. 40th St. CLEVELAND, O.

505 So. Western Ave. CHICAGO, ILL.

WHERE-TO-BUY

SANDS (Core, Molding, Blasting) (Cont'd.)
Nugent Sand Co., Muskegon, Mich.
Ottawa Silica Co., Ottawa, Ill.
Pangborn Corp., Hagerstown, Md.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis Sts., Philadelphia 24, Pa.
Producers Core Sand Corp., Michigan City, Ind.
Standard Silica Corp., 209 So. LaSalle St., Chicago 4, Ill.
Titanium Alloy Mfg Co., Niagara Falls, N. Y.

SAND BLAST BARRELS
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Pangborn Corp., Hagerstown, Md.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.
Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O.

SAND BLAST CABINETS
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Pangborn Corp., Hagerstown, Md.

SAND BLAST EQUIPMENT
American Air Filter Co., 266 Central Ave., Louisville 8, Ky.
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Pangborn Corp., Hagerstown, Md.
Parsons Engineering Corp., Cleveland 4, O.
Ruemelin Mfg. Co., 3850 North Palmer St., Milwaukee, 12, Wis.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.
Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O.

SAND BLAST NOZZLES
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Norton Company, Worcester 6, Mass.
Pangborn Corp., Hagerstown, Md.
Ruemelin Mfg. Co., 3850 N. Palmer St., Milwaukee 12, Wis.
W. W. Sly Mfg. Co., 4753 Train Ave., Cleveland 2, O.

SAND BLAST ROOMS
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Hydro-Blast Corp., 2550 N. Western Ave., Chicago 47, Ill.
Pangborn Corp., Hagerstown, Md.
Parsons Engineering Corp., Cleveland 4, O.
Ruemelin Mfg. Co., 3850 N. Palmer St., Milwaukee 12, Wis.
W. W. Sly Mfg. Co., 4735 Train Ave., Cleveland 2, O.

SAND BLAST TABLES
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Pangborn Corp., Hagerstown, Md.
Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O.

SAND CONTROL and TESTING EQUIPMENT
Harry W. Dietert Co., 9330A Roselawn Ave., Detroit 4, Mich.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.

SAND CONVEYING and HANDLING EQUIPMENT
American Air Filter Co., 266 Central Ave., Louisville 8, Ky.
C. O. Bartlett & Snow Co., 6201 Harvard Ave., Cleveland 5, O.
Beardsley & Piper Co., The, 2541 N. Keeler Ave., Chicago 39, Ill.
Chain Belt Co., 1671 W. Bruce St., Milwaukee 4, Wis.
Clearfield Machine Co., Clearfield, Pa.
Jeffrey Mfg. Co., 907-99 N. Fourth St., Columbus 16, O.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
Penn Iron Works, Reading, Pa.
Royer Foundry & Machine Co., Kingston, Pa.

SAND CONVEYING and HANDLING EQUIPMENT (Pneumatic)
Ajax Flexible Coupling Co., Westfield, N. Y.
Fuller Company, Catasaqua, Pa.
Robins Conveyors Inc., Passaic, N. J.

SAND DRYERS
C. O. Bartlett & Snow Co., 6201 Harvard Ave., Cleveland 5, O.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Pangborn Corp., Hagerstown, Md.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

SAND ENGINEERING SERVICE
Minco Products Corp., Saginaw, Mich.

SANDING MACHINERY (Electric Portable)
Skilsaw Inc., 5033 N. Elston, Chicago 30, Ill.

SAND MEASURING and WEIGHING DEVICES
Baker Perkins Inc., Saginaw, Mich.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.

SAND MIXERS
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Baker Perkins Inc., Saginaw, Mich.
Beardsley & Piper Co., The, 2541 N. Keeler Ave., Chicago 39, Ill.
Blystone Division Standard Sand & Machine Co., 549 W. Washington Blvd., Chicago 6, Ill.
Clearfield Machine Co., Clearfield, Pa.
Construction Machinery Corp., Waterloo, Iowa.
Grimes Molding Machine Co., 1429 Virginia Park, Detroit 6, Mich.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Royer Foundry & Machine Co., Kingston, Pa.

SAND PREPARATION EQUIPMENT
Ajax Flexible Coupling Co., Westfield, N. Y.
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Baker Perkins Inc., Saginaw, Mich.
Bartlett & Snow Co., C. O., 6201 Harvard Ave., Cleveland 5, O.
Beardsley & Piper Co., The, 2541 N. Keeler Ave., Chicago 39, Ill.
Chain Belt Co., 1671 W. Bruce St., Milwaukee 4, Wis.
Clearfield Machine Co., Clearfield, Pa.
Grimes Molding Machine Co., 1429 Virginia Park, Detroit 6, Mich.
Jeffrey Mfg. Co., 907-99 N. Fourth St., Columbus 16, O.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
Royer Foundry & Machine Co., Kingston, Pa.
Screen Equipment Co., Buffalo, N. Y.
Simplicity Engineering Co., Durand, Mich.

SAND RAMMERS
Chicago Pneumatic Tool Co., General Offices: 8 East 44th St., New York 17, N. Y.
Cleveland Pneumatic Tool Co., 3781 East 77th St., Cleveland 5, O.
Dayton Pneumatic Tool Co., Dayton 1, O.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago, Ill.
Master Tool Co., Inc., 5605 Herman Ave., Cleveland 2, O.

SAND RECLAIMERS
Hydro-Blast Corp., 2550 N. Western Ave., Chicago 47, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Nichols Engineering & Research Corp., 60 Wall Tower, New York 5, N. Y.
Stearns Magnetic Mfg. Co., 662 S. 28th St., Milwaukee 4, Wis.

SAND SIFTING and SCREENING MACHINERY
American Air Filter Co., 266 Central Ave., Louisville 8, Ky.
Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Foundry Supplies & Mfg. Co., 2221 Orchard St., Chicago 14, Ill.
Great Western Mfg. Co., Leavenworth, Kansas.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Royer Foundry & Machine Co., Kingston, Pa.
Screen Equipment Co., Buffalo, N. Y.

SAND STORAGE BINS & GATES
Beardsley & Piper Co., The, 2541 N. Keeler Ave., Chicago 39, Ill.

—When writing advertisers, please mention THE FOUNDRY—

CLEVELAND PRECISION BUILT VIBRATORS

CLEVELAND *Improved* MATCH PLATE VIBRATOR

Positive, efficient action . . . . Square chromed steel body permits easy handling for servicing . . . . Match Plate Vibrators available from stock in sizes from ⅜" to 1¼" piston diameter. Write for our catalog listing our complete line.

CLEVELAND VIBRATOR COMPANY
2110 SUPERIOR AVENUE WEST • CLEVELAND, OHIO

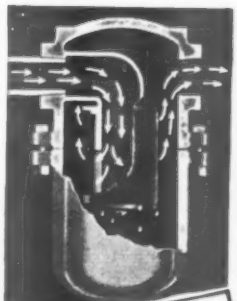
For dry, clean, oil free COMPRESSED AIR

USE THIS 2-WAY SEPARATOR

WATER, dirt and oil have no place in compressed air. They deteriorate air hoses and equipment rapidly, besides causing imperfect results in many services.

The Johnson Gast Separator combines the two most effective methods of removing these objectionable substances. First the air is allowed to expand, precipitating most of the moisture. Then it passes through the "thousand baffles", changing direction of flow many times and surrendering particles of water and dirt at every turn.

When water has been vaporized by the heat generated in compressing air, the Johnson Gast Aftercooler is installed ahead of the separator to condense the vapor. For services where every trace of oil must be removed—as in paint spraying—the Johnson Gast Oil Absorber is used.



1. Air expands — precipitates moisture.
2. "Thousand Baffles" change flow direction—capture remaining water and dirt.

Write for Bulletin

THE JOHNSON CORPORATION
870 Wood St., Three Rivers, Mich.

Johnson Gast Separators also available for use on steam lines.

JOHNSON-GAST
SEPARATORS • AFTERCOOLERS • OIL ABSORBERS

TIECO
FOUNDRY LADLES

TIECO geared ladles eliminate binding or sticking gear troubles. This patented feature assures accurate pouring and long life, due to the absence of drops and jerks and all trouble due to distortion or springage of the Bail or Bowl or both, caused by heat is removed. TIECO Ladles come in all types and sizes and are furnished for manual or electric operation.

Write for descriptive literature.

THE INDUSTRIAL EQUIPMENT COMPANY
115 OHIO STREET • MINSTER, OHIO

CMC

FOUNDRY MIXERS

Fast, dependable core sand Mixers. Triple mixing hoes assure thorough action. Flared drum forquickeasycharging and discharge. Available with replaceable full hard abrasion resisting drum liner at slight extra cost.

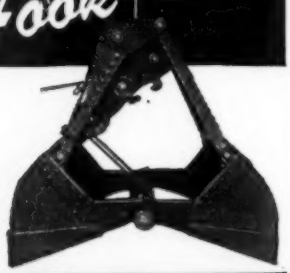
WRITE FOR INFORMATION AND LITERATURE ON

CMC FOUNDRY MIXERS
CARTS, BARROWS AND
TIPOVER BUCKETS

• *For Sale By Leading Dealers Everywhere* •

CONSTRUCTION MACHINERY CO.
WATERLOO, IOWA

ERIE *Hook-On*



Erie Hook-On Buckets are built in sizes, weights and capacities to meet any set of foundry conditions imposed by crane or material.

ERIE STEEL CONSTRUCTION CO • ERIE, PA.
AggreMeters • Buckets • Concrete Plants • Traveling Cranes

BERKSHIRE
Jolt Squeeze
MOLDING
MACHINES

Model H Jolt Squeeze

CANNON
AIR
VIBRATORS

10"
SQUEEZE
CYLINDER

4"
JOLT
CYLINDER

CANNON VIBRATOR CO. • 1111 Power Ave. Cleveland, Ohio • BERKSHIRE MFG. CO

WHERE-TO-BUY

SAND STORAGE BINS & GATES (Cont'd.)
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Neff & Fry Co., Camden, O.

SANDING MACHINERY
Delta Mfg. Co., Industrial division, 620 E. Vienna Ave., Milwaukee 1, Wis.
Oliver Machinery Company, Grand Rapids 2, Mich.

SAWS (Band, Metal, Wood)
Delta Mfg. Co., Industrial division, 620 E. Vienna Ave., Milwaukee 1, Wis.
Do All Div., Continental Machines Inc., Des Plaines, Ill.
Kling Brothers Engineering Works, 1300 N. Kostner Ave., Chicago 51, Ill.
Oliver Machinery Company, Grand Rapids 2, Mich.

SAWS (Cold Metal)
Bethlehem Steel Co., Bethlehem, Pa.
Kling Brothers Engineering Works, 1300 N. Kostner Ave., Chicago 51, Ill.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.
Do All Div., Continental Machines Inc., Des Plaines, Ill.

SAWS (Electric Portable)
Skilsaw Inc., 5033 N. Elston, Chicago 30, Ill.

SAWS (Masonry)
Clipper Mfg. Co., 4030 Manchester, St. Louis, Mo.

SCALING HAMMERS
Dayton Pneumatic Tool Co., Dayton 1, O.
Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago, Ill.
Master Tool Co., Inc., 5605 Herman Ave., Cleveland 2, O.
Schramm Inc., West Chester, Pa.

SCHOOLS (Correspondence)
McLain's System, Inc., Goldsmith Bldg., Milwaukee 2, Wis.

SCREENS (Shake-Out)
C. O. Bartlett & Snow Co., 6201 Harvard Ave., Cleveland 5, O.
Beardsley & Piper Co., The, 2541 N. Keeler Ave., Chicago 39, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Screen Equipment Co., Buffalo, N. Y.
Simplicity Engineering Co., Durand, Mich.

SCREENS (Sifting)
Buffalo Wire Works Co., 425 Terrace, Buffalo 2, N. Y.

SCREENS (Vibrating)
Ajax Flexible Coupling Co., Westfield, N. Y.
Robins Conveyors, Inc., Passaic, N. J.
Screen Equipment Co., Buffalo, N. Y.

SEA COAL
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Smith Facing & Supply Co., 1857 Carter Rd., Cleveland 13, O.
Frederic B. Stevens, Inc., Detroit 26, Mich.
Midwest Foundry Supply Co., Edwardsville, Ill.

SEPARATORS (Abrasive)
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Pangborn Corp., Hagerstown, Md.

SEPARATORS (Air, Mois ... (Oil)
American Air Filter Co., 266 Central Ave., Louisville 8, Ky.
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.
Johnson Corporation, Three Rivers, Mich.
Jas. A. Murphy & Co., Hamilton, O.
Pangborn Corp., Hagerstown, Md.
Schrader's Son, A., 470 Vanderbilt Ave., Brooklyn 17, N.Y.

SEPARATORS (Magnetic)
Ajax Flexible Coupling Co., Westfield, N. Y.
Beardsley & Piper Co., The, 2541 N. Keeler Ave., Chicago 39, Ill.
Dings Magnetic Separator Co., 512 E. Smith St., Milwaukee 7, Wis.
Stearns Magnetic Mfg. Co., 662 S. 28th St., Milwaukee 4, Wis.

SHAKE-OUT MACHINERY
Ajax Flexible Coupling Co., Westfield, N. Y.
American Air Filter Co., 266 Central Ave., Louisville 8, Ky.

SHAKE OUT MACHINERY (Cont'd.)
C. O. Bartlett & Snow Co., 6201 Harvard Ave., Cleveland 5, O.
Beardsley & Piper Co., The, 2541 N. Keeler Ave., Chicago 39, Ill.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
Jackson & Church Co., Saginaw, Mich.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
New Haven Vibrator Co., 131 Chestnut St., New Haven 7, Conn.
Robins Conveyors Inc., Passaic, N. J.
Royer Foundry & Machine Co., Kingston, Pa.
Simplicity Engineering Co., Durand, Mich.

SHOT AND GRIT
Alloy Metal Abrasive Co., 311 W. Huron St., Ann Arbor, Mich.
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
American Steel Abrasives Co., Galion, O.
Globe Steel Abrasive Co., Mansfield, O.
Great Lakes Foundry Sand Co., United Artists Bldg., Detroit 26, Mich.
Hickman-Williams & Co., Cleveland 14, O.
Pangborn Corp., Hagerstown, Md.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis Sts., Philadelphia 24, Pa.
Pittsburgh Crushed Steel Co., Pittsburgh 1, Pa.
Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O.
Steel Shot & Grit Co. Inc., 39 Warren Ave., Boston, Mass.

SHOVELS
Federal Foundry Supply Co., 4600 E. 71st ... 5, O.
Frederic B. Stevens, Inc., Detroit 26, Mich.
Wood Shovel & Tool Co., Piqua, O.

SHOVELS (Crawler)
Link Belt Speeder Corp., 307 N. Michigan Ave., Chicago, Ill.

SILICA FLOUR
Ottawa Silica Co., Ottawa, Ill.
Standard Silica Corp., 209 So. LaSalle St., Chicago 4, Ill.

SILICON (Briquets)
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York 17, N.Y.

SILICON CARBIDE (Briquets)
Carborundum Co., Niagara Falls, N. Y.

SKIMMER BARS
Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.

SKIMMERS
Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.

SKIP HOISTS
Beardsley & Piper Co., The, 2541 N. Keeler Ave., Chicago 39, Ill.
Gardner-Denver Co., Gardner Drive, Quincy, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

SLIP FLASKS
Adams Co., 700 Foster St., Dubuque, Iowa.
Hines Mfg. Co., 1324 Hird Ave., Cleveland 7, O.

SLIP JACKETS
Adams Co., 700 Foster St., Dubuque, Iowa.
Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Freeman Supply Co., 1152 Broadway, Toledo 5, O.
Fremont F... Fremont, O.
Hines Mfg. Co., 1324 Hird Ave., Cleveland 7, O.

SMELTERS & REFINERS
American Smelting & Refining Co., 120 Broadway, New York 5.
Bohn Aluminum & Brass Corp., 1400 Lafayette Bldg., Detroit 26, Mich.
Greenfield Co. Inc., Samuel, 31 Stone St., Buffalo, N. Y.
Niagara Falls Smelting & Refining Corp., 2204 Elmwood Ave., Buffalo 17, New York.

SNAGGING WHEELS—See **ABRASIVE WHEELS**

—When writing advertisers, please mention THE FOUNDRY—

ESTABLISHED 1788

THE E. & G. BROOKE IRON COMPANY

◆

Manufacturers of

Basic, Malleable, Foundry, Forge and Low Phosphorus Pig Iron

◆

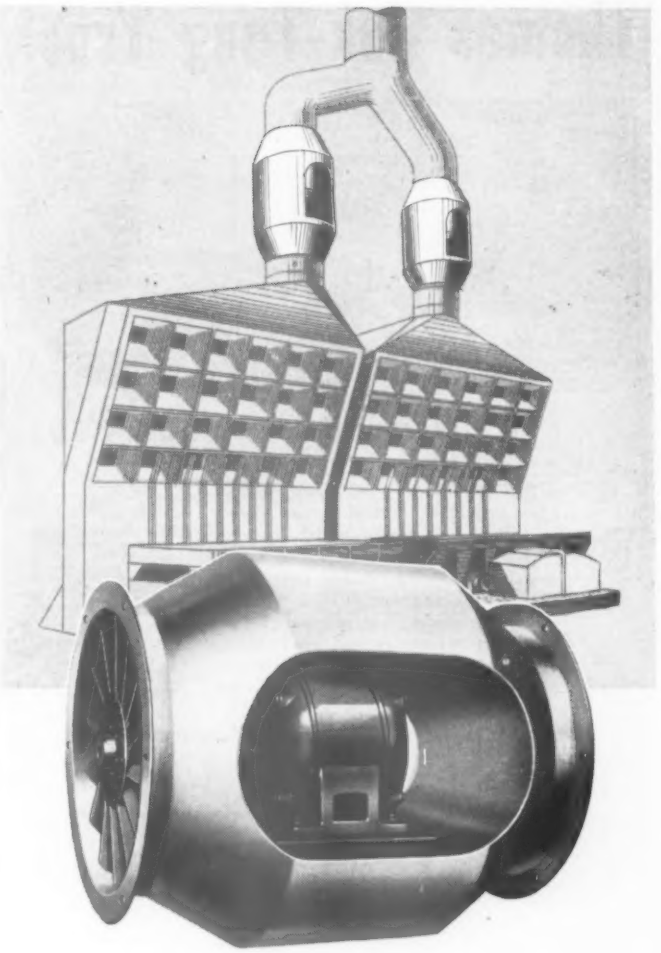
BIRDSBORO, PENNSYLVANIA

Rawhide

The best "soft" hammers and mallets are rawhide — tough, resilient, long-lasting C/R mechanical rawhide. They strike effective blows without battering or marring . . . without fatiguing re-coil. They hold their true striking surfaces. Sizes and weights for every need. Hammers are malleable iron with replaceable C/R Rawhide insert faces.

Write for Catalog Sheets.

CHICAGO Rawhide MFG. CO.
1384 ELSTON AVE. ★ CHICAGO, ILLINOIS.



AIR SANITATION
solved with
DeBOTHEZAT BIFURCATORS

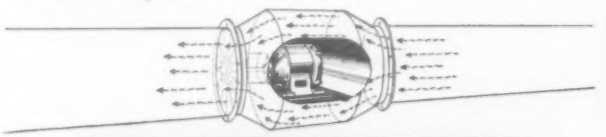
This "Axial-Flow" pressure fan removes dust, dirt, odors and hazardous gases from air. A definite solution to many problems of employees' health protection.

Installation Is Easy

Installation of the Bifurcator is simple. It is readily installed in the present duct, just like a section of duct work. Operates equally well in any position — vertical through horizontal. No elbow bends or supporting platforms are needed.

How a Bifurcator Ventilator Operates

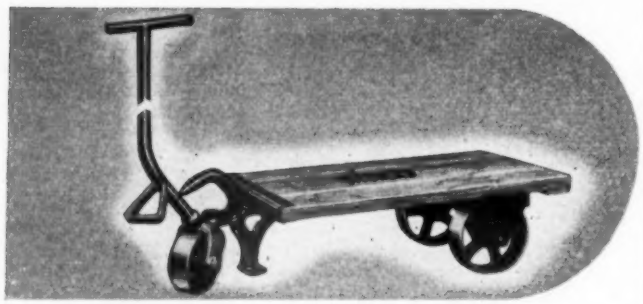
This different type of ventilating unit is sensibly designed and soundly engineered. The motor is readily accessible and is isolated from the fumes. *Air stream* is *by-passed* AROUND motor chamber *through twin passages,* which converge into the duct at both ends of the Bifurcator. The fan's non-overloading characteristic protects against costly motor failure. Available in a wide range of sizes and air capacities. Write for descriptive literature and prices.

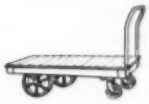


DeBothezat Bifurcators

DeBOTHEZAT FAN DIVISION OF AMERICAN MACHINE AND METALS, INC.
EAST MOLINE, ILLINOIS

Thomas Jak-Tung Truck





Heavy Duty Foundry Type

Series 110 with No. 101 Jak-Tung

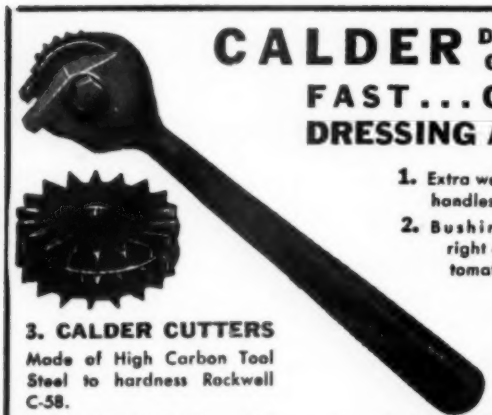
Heavy steel rear wheel and platform support. Center leg permits tipping truck on sides for unloading; clears any floor obstruction. Thick hardwood plank platform. Steel frame across front end. Heavy one-piece cast steel leg with left socket and hand grip. Dust sealed malleable wheels. Hyatt bearings. Made in 15 sizes. Capacities 2500 lbs. to 6000 lbs. Small illustrations, right, show steel and wood flared trays for #110.

THOMAS TRUCK of Keokuk

THOMAS TRUCK AND CASTER COMPANY
461 Mississippi River, Keokuk, Iowa

CALDER DRESSERS CUTTERS

FAST...CLEAN DRESSING ACTION



1. Extra weight in Dresser handles.
2. Bushings threaded right and left for automatic tightening.

3. CALDER CUTTERS
Made of High Carbon Tool Steel to hardness Rockwell C-58.

ALL SIZES for all GRINDING WHEELS

CALDER MFG. CO. • LANCASTER, PA.

TODAY...
MORE THAN EVER

there is a demand for trained foundrymen who can guarantee quality castings—lowest loss—increased production—and quality semi-steel which is possible ONLY when there is a thoro understanding of good melting.

OUR REPORT ON YOUR CUPOLA is worth the fee alone. A cost system will show when you are losing—but will not stop the leaks. Distance is no bar. Write for FREE SYNOPSIS.

McLAIN'S SYSTEM INC.
803 Goldsmith Bldg. Milwaukee, Wis.

WHERE-TO-BUY

SNAP FLASKS
Adams Co., 700 Foster St., Dubuque, Iowa.

SODA ASH
Hercules Powder Co., 999 Market St., Wilmington 99, Del.
Great Lakes Foundry Sand Co., United Artists Bldg., Detroit 26, Mich.
Mathieson Alkali Works, Inc., 60 E. 42nd St., New York 17, N.Y.

SOLDER
American Smelting & Refining Co., 120 Broadway, New York 5.

SPIEGELEISEN
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York 17, N. Y.

SPRAY GUNS
Metallizing Co., of America, 1330 W. Congress St., Chicago 7, Ill.
Murphy & Co., Jas. A., Hamilton, O.
New Haven Vibrator Co., 121 Chestnut St., New Haven 7, Conn.

SPRUE CUTTERS
Adams Co., 700 Foster St., Dubuque, Iowa.
Freeman Supply Co., Toledo 5, O.

STAMPS & HOLDERS (Steel)
M. E. Cunningham Co., 97 E. Carson St., Pittsburgh 19, Pa.

STARS (Tumbling)
Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O.

STEEL (High Speed)
Bethlehem Steel Co., Bethlehem, Pa.

STEEL (Structural)
American Bridge Co., Pittsburgh 19, Pa.
Bethlehem Steel Co., Bethlehem, Pa.

STEEL WASH
Dayton Oil Co., Dayton 1, O.

STORAGE BATTERIES (Industrial)
Philco Storage Battery Div., Philco Corporation, Trenton, N. J.

STRIPPING MACHINES
Adams Co., 700 Foster St., Dubuque, Iowa.
Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Davenport Machine & Foundry Co., Davenport, Iowa.
International Molding Machine Co., [illegible] Ill.
Milwaukee Foundry Equipment Co., [illegible] St., Milwaukee, Wis.

SULPHUR DIOXIDE
Ansul Chemical Co., Marinette, Wis.

SURFACE TREATMENT METALS
N. Ransohoff, Inc., 208 W. 71st St., Cincinnati 16, O.

TAPER PINS
Haskins Co., R. G., 615 So. California Ave., Chicago 12, Ill.
Standard Horse Nail Corp., New Brighton, Pa.

TAPPING MACHINES
H. G. Haskins Co., 516 So. California Ave., Chicago 12, Ill.

TEMPERATURE CONTROLLERS
Illinois Testing Laboratories, 418 N. LaSalle St., Chicago 10, Ill.
Marshall Co., L. H., 270 W. Lane Columbus 1, O.

TESTING LABORATORIES
Harry W. [illegible] Roselawn Ave., Detroit 4, Mich.
Chas. C. Kawin Co., 431 So. Dearborn St., Chicago 5, Ill.

TESTING MACHINERY
Riehle Testing Mach. Div., American Machine & Metals Inc., East Moline, Ill.

THERMOCOUPLES
Ellematic Equipment Corp., 6046 S. Wentworth Ave., Chicago 21, Ill.
Illinois Testing Laboratories, 418 N. LaSalle St., Chicago 10, Ill.
Marshall Co., L. H., 270 W. Lane, Columbus 1, O.

TIMERS (Electric)
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.

TIN
American Smelting & Refining Co., 120 Broadway, New York 5, N. Y.

TONGS
Industrial Equipment Co., Minster, O.

TOOLS (Electric Portable)
Skilsaw Inc., 5033 N. Elston, Chicago 30, Ill.

TOOLS (Pneumatic, Portable)
Chicago Pneumatic Tool Co., General Offices: 8 East 44th St., New York 17, N. Y.
Cleveland Pneumatic Tool Co., 3781 East 77th St., Cleveland 5, O.
Dayton Pneumatic Tool Co., Dayton 1, O.
Gardner-Denver Co., Gardner Drive, Quincy, Ill.
Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Master Tool Co. Inc., 5605 Herman Ave., Cleveland 2, O.
Schramm Inc., West Chester, Pa.

TORCHES and BURNERS (Acetylene, gas, oil)
Freeman Supply Co., Toledo 5, O.
Liquid Carbonic Corp., 3110 S. Kedzie Ave., Chicago 23, Ill.
North American Mfg. Co., 2910 E. 75th St., Cleveland 4, O.

TRACTORS (Gas Powered)
Clark Tructractor Div. of Clark Equipment Co., Battle Creek, Mich.

TRAILERS (Platform)
Thomas Truck & Caster Co., Keokuk, Iowa.

TRAMRAIL SYSTEMS
American MonoRail Co., 13104 Athens Ave., Cleveland 7, O.
Chicago Tramrail Co., 2910 Carroll Ave., Chicago 12, Ill.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., 1155 East 283rd St., Wickliffe, O.
Modern Equipment Co., Dept. 199, Port Washington, Wis.

TRAPS (Steam)
Johnson Corporation, Three Rivers, Mich.

TROLLEYS
Curtis Pneumatic Machinery Co., 1922 Kienlen Ave., St. Louis 20, Mo.
Modern Equipment Co., Dept. 199, Port Washington, Wis.

TRUCK BATTERIES (Industrial)
Philco Storage Battery Div., Philco Corporation, Trenton, N. J.

TRUCK CRANES
Automatic Transportation Co., 121 West 87th St., Chicago 20, Ill.
Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland, Ohio.

TRUCKS (Electric-Industrial)
Automatic Transportation Co., 121 West 87th St., Chicago 20, Ill.
Elwell-Parker Electric Co., Cleveland, O.

TRUCKS (Power Lift)
Automatic Transportation Co., 121 West 87th St., Chicago 20, Ill.
Clark Tructractor Div. of Clark Equipment Co., [illegible]
Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland, Ohio.

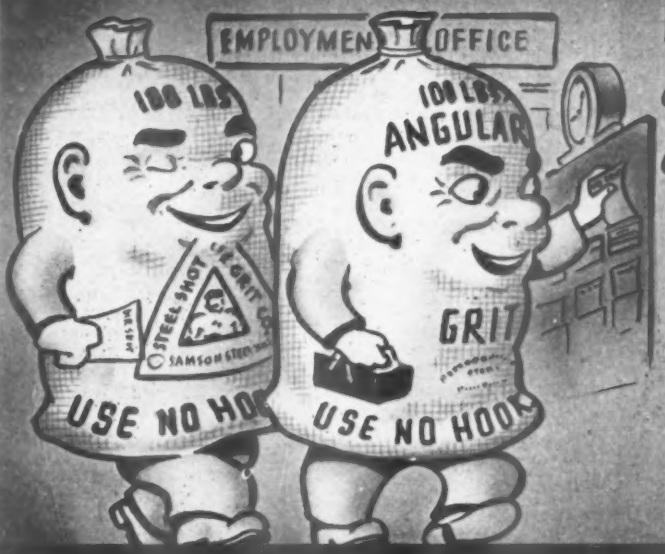
TRUCK WHEELS
Automatic Transportation Co., 121 West 87th St., Chicago 20, Ill.
Bethlehem Steel Co., Bethlehem, Pa.
French & Hecht, 523 East 3rd St., Davenport, Iowa.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.
Thomas Truck & Caster Co., Keokuk, Iowa.

TUBES (X-Ray)
General Electric X-Ray Corp., 2012 Jackson Blvd., Chicago 12, Ill.
Machlett Laboratories, Springdale, Conn.
Picker X-Ray Corp., 300 Fourth Ave., New York City 10.

TUMBLING BARRELS
Cleveland Chaplet & Mfg. Co., 1197 West 67th St., Cleveland 2, O.
N. Ransohoff Inc., 208 W. 71st St., Cincinnati 16, O.
Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

—When writing advertisers, please mention THE FOUNDRY—

"PUNCH US IN" your shop and we'll work harder and longer and cheaper than you ever dreamed possible!



"CERTIFIED" STEEL ABRASIVE, both Shot and Grit, are the toughest guys ever put to work at blast cleaning. Tackling every job given them with "fists of hardened steel" they remove scale and dirt from metal parts with magical quickness. But beneath their hardened exteriors beat hearts of loyal softness. They never "charge" much for their time; they never lay down on the job; and they take months of roughest treatment before requiring replacement. In other words—put them on your pay roll NOW for 100% satisfaction.

PITTSBURGH CRUSHED STEEL CO.
PITTSBURGH, PENNA.

STEEL SHOT AND GRIT CO.
BOSTON, MASS.

IMMEDIATE DELIVERY
FROM OUR NEW AND INCREASED WAREHOUSE STOCKS

★

Molding Sands, Foundry Supplies and Equipment for Every Purpose!

MIDWEST FOUNDRY SUPPLY CO.
EDWARDSVILLE, ILLINOIS

St. Louis Tele.: REpublic 5097 — *Edwardsville Office, 76*

WEST CUT-OFF WHEELS

The only wheel developed especially for the cutting of gates and risers

THERE IS A WEST WHEEL FOR EVERY NONFERROUS, STEEL OR IRON CUTTING JOB

THE WEST COMPANY

1117 SHACKAMAXON ST., PHILADELPHIA, PA.

YOU WON'T NEED.. A PINCH HITTER

—when Pangborn-Norbide* Blast Nozzles go to bat for you!

Here is the world's toughest, hardest, longest wearing material made up into all standard size linings and protected by a polished cover of cold rolled steel. Getting these nozzles under contract for your team will send your batting averages in production, economy and satisfaction to new championship levels.

Cleaning costs will come down, time-out for nozzle changes will be nil and production will be increased.

Put Pangborn-Norbide* on your side. Write today to see how profitable it will be to sign him up NOW.

GUARANTEE

750 hours with sand
1500 hours with steel abrasive.

*Trade Mark of Norton Co. for Boron Carbide

PANGBORN CORPORATION

The World's Largest Manufacturer of Blast Cleaning and Dust Collecting Equipment

HAGERSTOWN . . . . MARYLAND

CHAMPION EMERY WHEEL DRESSERS

A Type and Size for Every Wheel

Made of special material —processed and heat treated—runs in oil bearing. *Send for details and prices.*

WESTERN TOOL & MFG. CO., Springfield, Ohio

Consulting Service on

ELECTRIC FURNACE PROBLEMS

Operation • Plant Layout • Furnace Design

W. HARVEY PAYNE

141 W. Jackson Blvd. · WAbash 3550 · Chicago (4)

BAR RAY BROOKLYN NEW YORK

X-RAY AND GAMMA-RAY PROTECTION

AMONG THOSE WE SERVE!

Martin Bomber • Fairchild Aviation • Brooklyn Navy Yard
Eclipse Aviation • Bethlehem Steel • U. S. Agencies and
Bell Aircobra • Picatinny Arsenal War Plants

BAR-RAY PRODUCTS, INC.

Plant and Mill: 209—25th STREET, BROOKLYN 32, N. Y.

TEL: SOuth 8-5225 • AGENCIES IN PRINCIPAL CITIES

WHERE-TO-BUY

TURNTABLES
Beardsley & Piper Co., The, 2541 N. Keeler Ave., Chicago 39, Ill.
Chain Belt Co., 1671 W. Bruce St., Milwaukee 4, Wis.
Modern Equipment Co., Dept. 199, Port Washington, Wis.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

UNLOADERS (Portable - Gas, Electric)
Cleveland Formgrader Co., 6723 Denison Ave., Cleveland, Ohio.

VALVES, AIR
Cleveland Vibrator Co., 2110 Superior Ave. W., Cleveland, O.
New Haven Vibrator Co., 131 Chestnut St., New Haven 7, Conn.

VALVES (Air, Water, Steam)
Air-Way Pump & Equipment Co., 405 S. Jefferson St., Chicago 7, Ill.
Galland-Henning Mfg. Co., 2750 So. 31st St., Milwaukee, Wis.
North American Mfg. Co., 2910 E. 75th St., Cleveland 4, O.

VALVES (Adjustable Orifice)
North American Mfg. Co., 2910 E. 75th St., Cleveland 4, O.

VALVES (Blow-off and Cut-off)
Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Cleveland Vibrator Co., 2110 Superior Ave. W., Cleveland, O.
Wm. H. Nicholls Co., Richmond Hill, Long Island 18, N. Y.

VENTILATING SYSTEMS
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
DeBothezat Ventilating Div., American Machine & Metals Co., East Moline, Ill.
Kirk & Blum Mfg. Co., 2838 Spring Grove Ave., Cincinnati 25, O.
Pangborn Corp., Hagerstown, Md.
Parsons Engineering Co., Cleveland 4, O.
Peters-Dalton Inc., 628 E. Forest Ave., Detroit 1, Mich.
Ross, J. O., Engineering Corp., 350 Madison Ave., New York 17.
Schneible Co., Claude B., 2827—25th St., Detroit 16, Mich.
W. W. Sly Mfg. Co., 4753 Train Ave., Cleveland 2, O.
B. F. Sturtevant Co., Hyde Park, Boston, Mass.

VENTS (Core Box)
Demmler & Bros., Wm., Kewanee, Ill.
C. M. Smillie & Co., 1100 Woodward Hgts. Blvd., Ferndale, Mich.

VIBRATORS
Adams Co., 700 Foster St., Dubuque, Iowa.
Beardsley & Piper Co., The, 2541 N. Keeler Ave., Chicago 39, Ill.
Cannon Vibrator Co., 1111 Power Ave., Cleveland 14, O.
Cleveland Vibrator Co., 2110 Superior Ave. W., Cleveland, O.
Davenport Machine & Foundry Co., Davenport, Iowa.
Foundry Supplies & Mfg. Co., 2221 Orchard St., Chicago 14, Ill.
Freeman Supply Co., 1152 Broadway, Toledo 5, O.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
Link Belt Co., 300 W. Pershing Rd., Chicago, Ill.
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee, Wis.
New Haven Vibrator Co., 131 Chestnut St., New Haven 7, Conn.
Nicholls Co., Wm. H., Richmond Hill, Long Island 18, N. Y.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis Sts., Philadelphia 24, Pa.
S P O Incorporated, 7300 Grand Division Ave., Cleveland 5, O.
Syntron Company, Homer City, Pa.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.

VIBRATORS (Core Bench)
Cleveland Vibrator Co., 2110 Superior Ave. W., Cleveland, O.
New Haven Vibrator Co., 131 Chestnut St., New Haven 7, Conn.

WAX (Core, Vent, Pattern)
United Compound Co., Inc., 328 South Park Ave., Buffalo 4, N. Y.

WEDGES (Foundry)
Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14 Wis.

WELDING GAS
Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.
Liquid Carbonic Corp., 3110 S. Keozie Ave., Chicago 23, Ill.

WELDING (Acetylene Generators)
Sight Feed Generator Co., Richmond, Ind.

WELDING APPARATUS (Electric Arc)
Sight Feed Generator Co., Richmond, Ind.
Metallizing Co. of America, 1330 W. Congress St., Chicago 7, Ill.
Westinghouse Electric & Mfg. Co. East Pittsburgh, Pa.

WELDING and CUTTING APPARATUS and SUPPLIES
Air Reduction Sales Co., 60 East 42rd St., New York 17, N. Y.
Liquid Carbonic Corp., 3110 S. Keozie Ave., Chicago 23, Ill.

WELDING ELECTRODES (Carbon)
National Carbon Co. Inc., Carbon Products Div., Cleveland 1, O.

WELDING RODS & ELECTRODES
Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.
Metallizing Co. of America, 1330 W. Congress St., Chicago 7, Ill.

WHEELBARROWS
Construction Machinery Corp., Waterloo, Iowa.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.

WHEELBARROW WHEELS
French & Hecht, 523 East 3rd St. Davenport, Iowa.
Thomas Truck & Caster Co., Keokuk, Iowa.

WHEELS (Cut-off)
West Co., Inc., 1117 Shackamaxon St., Philadelphia 25, Pa.

WHEELS (Metal)
Thomas Truck & Caster Co., Keokuk, Iowa.

WHEELS (Wire)
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.

WIRE BRUSHES
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.

WIRE CLOTH
Buffalo Wire Works Co., 425 Terrace, Buffalo 2, N. Y.

WIRE NAILS
Bethlehem Steel Co., Bethlehem, Pa.

WOODWORKING MACHINERY
Delta Mfg. Co., Industrial division, 600 E. Vienna Ave., Milwaukee 1, Wis.
Do All Div., Continental Machines Inc., Des Plaines, Ill.
Freeman Supply Co., 1152 Broadway, Toledo 5, O.
Oliver Machinery Co., Grand Rapids 2, Mich.

X-RAY EQUIPMENT
Bar-Ray Products Inc., 209 Twenty-fifth St., Brooklyn, N. Y.
General Electric X-Ray Corp., Dept. N 37, 2012 Jackson Blvd. Chicago 12, Ill.
Kelley-Koett Mfg. Co., 212 W. 4th St., Covington, Ky.
Magnaflux Corporation, 5910 Northwest Highway, Chicago 41, Ill.
Picker X-Ray Corp., 300 Fourth Ave., New York 10, N. Y.
Westinghouse Electric & Mfg. Co. East Pittsburgh, Pa.

X-RAY FILMS
Eastman Kodak Co., Rochester, N. Y.
General Electric X-Ray Corp., 2012 Jackson Blvd., Chicago 12, Ill.
Picker X-Ray Corp., 300 Fourth Ave., New York 10, N. Y.

X-RAY INSPECTION
Kelley-Koett Mfg. Co., 212 W. 4th St., Covington, Ky.
Magnaflux Corporation, 5910 Northwest Highway, Chicago 41, Ill.
Picker X-Ray Corp., 300 Fourth Ave., New York 10, N. Y.

X-RAY PROTECTIVE MATERIALS
Bar-Ray Products Inc., 209 Twenty-fifth St., Brooklyn, N. Y.

X-RAY TUBES
Machlett Laboratories, Springdale, Conn.

ZINC
American Smelting & Refining Co. 120 Broadway, New York 5, N. Y.

—When writing advertisers, please mention THE FOUNDRY—

Gasweld

MOLD DRYING TORCH

Provides

A LARGE, BUSHY FLAME TO COVER WIDE AREAS!

★ The last word in convenience, safety and efficiency for the foundry, "GasWeld" torches provide a large, bushy flame that sweeps away moisture, covers wide areas and gets into hard-to-reach corners of molds. Ruggedly constructed, well-balanced and easy to handle, these torches provide quick, complete drying. Light weight—only 3½ pounds—they operate efficiently on pressures as low as 4 ounces, using natural or city gas.

Write today for full details and "GasWeld" Catalog

Wall Chemicals Division of THE LIQUID CARBONIC CORPORATION 3110 S. Kedzie Ave., Chicago 23, Illinois

Manufacturers of Oxygen and Acetylene and the "GasWeld" Line of Welding and Cutting Apparatus

Branches: Buffalo • Detroit • Cincinnati • Louisville • Milwaukee • Rochester • Toledo

FIRST COME, FIRST SERVED

If you are engaged in essential war work, you can very likely install bins now. If not, get your order on file for installation as soon as permitted. First come, first served. If you would thrive in post-war days, equip your plant to do so. Order sand in quantities, to save on price. Have it arrive in condition and hold its condition by protecting it in bins. Keep plenty on hand to avoid being caught short.

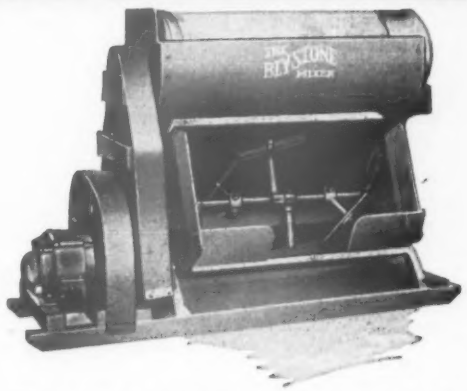
Neff & Fry bins are not costly, but they do give a lifetime of service—definitely pay their way.

Get Neff & Fry Foundry bin catalog at once.

THE NEFF & FRY COMPANY, Camden, Ohio

NEFF & FRY STORAGE BINS

BLYSTONE • MIXERS •

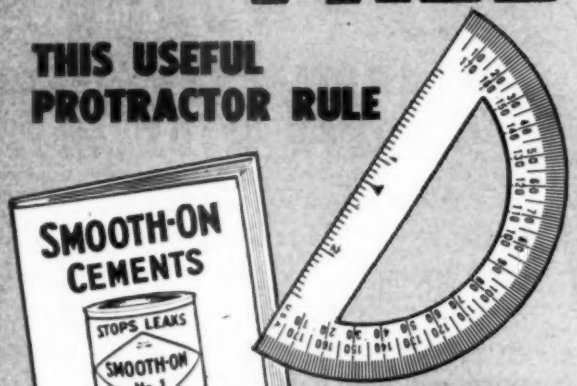


THE paddle-type mixer for core sand mixing in the foundry. Blystone Mixers offer: low mix cost, thorough mixing, and easy operation. There is a sturdily built type and size for your problem. Send for the new Bulletin and full details.

• BLYSTONE DIVISION •
STANDARD SAND & MACHINE CO.
549 W. Washington Boulevard, Chicago, Illinois

Both FREE

THIS USEFUL PROTRACTOR RULE



THIS HANDY REPAIR HANDBOOK

All you have to do is sign and mail the coupon. You'll receive, without any expense whatsoever:

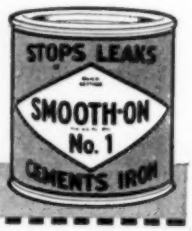
1.—An accurate metal protractor clearly marked, with angles reading in both directions and the straight side scaled in inches.

2.—The 40-page, pocket size Smooth-On Handbook, showing how to make dozens of necessary repairs to plant equipment, pipe lines and structures with Smooth-On Iron Cements. 170 diagrams. Clear, concise directions. Conveniently indexed.

WHAT THE BOOK SHOWS

This repair handbook shows how you can SEAL CRACKS in casings or shells of pumps, heaters, process apparatus, valves, machinery castings, pipes, and pipe fittings, etc. . . . STOP LEAKS at seams, threaded or flanged joints, bolts, rivets, etc. . . . TIGHTEN loose screws, bolts, handles, pulls, fixtures, etc. on tools, utensils . . . WATERPROOF wet cellars, concrete, brick or stone floors, walls, etc.

You can obtain Smooth-On from your supply house or, if necessary, from us. And be sure to mail the coupon before our limited supply of protractors is gone.



MAIL IT TODAY The SUPPLY IS LIMITED!

FREE—Send Today

Smooth-On Mfg. Co., Dept. 17
570 Communipaw Ave., Jersey City 4, N. J.

Please mail me my Protractor and the Handbook

Name .....

Address .....

.....

10-44

Do it with SMOOTH-ON

For Better Blown Cores, Use

DEMMLER CORE BOX VENTS

PERFORATED VENTS
No. 00, No. 0, No. 1 or No. 2 holes

SLOTTED VENTS
Brass or Steel
Slots .010" to .015"

WM. DEMMLER & BROS.
Kewanee - Illinois

GREENE FURNACES are built to make steel;— not just to melt it. But if all you want is to melt steel fast,—we can furnish a furnace with ample power capacity to melt the steel charge in an hour (and the furnace too in an hour). But quality will get the business after the emergency, if not now.

GREENE ELECTRIC FURNACE CO. 71 Columbia St. Seattle 4, Wn.

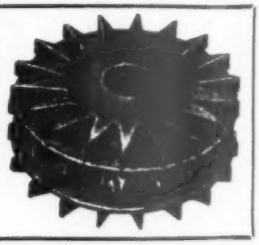
PRODUCERS CORE SAND CORPORATION

PITS AT MICHIGAN CITY, INDIANA AND SAWYER, MICHIGAN

MICHIGAN CITY, INDIANA

Grinding Wheel Dressers

■ We manufacture the only complete line of dressers and cutters. Write for copy of catalog "F" and name of your nearest dealer.



DESMOND-STEPHAN MFG. CO.
Urbana, Ohio
Canadian D. S. Mfg. Co., Hamilton, Ont.

ELEMENTARY FOUNDRY TECHNOLOGY

Edited and Revised by Edwin Bremer and Pat Dwyer

This completely revised third edition, is a text designed primarily for foundry apprentices and practical students of foundry operations. 375 pages, 6 x 9—Index—132 Illustrations—16 tables. *Price* $3.00 *Postpaid.*

THE FOUNDRY

Penton Building — Book Department — Cleveland, Ohio
555-F

Let 'Em Help Your Foundry

HAUCK MOLD DRYERS
LADLE HEATERS
CUPOLA LIGHTERS
FURNACE BURNERS

SAVE TIME • FUEL • WORK

Use Hauck Portable Oil Burner Outfits with interchangeable burners for ladle heating and drying, skin drying of molds and cupola lighting. Also hand torches for small molds, cores, etc. Burns kerosene or fuel oil. Our 42 years' experience at your service—write us.

HAUCK MANUFACTURING CO., 106 Tenth St., Brooklyn, N.Y.

NICHOLS

Pouring 5,000,000 lbs. of aluminum and 3,000,000 lbs. of magnesium per month—more than any similar foundry in the world necessitated a sand reclaiming system—

- to save money
- to lessen transportation problems
- to insure an adequate supply of sand as needed
- to eliminate the used sand disposal problem

A solution which reclaims 98% of the sand was the installation of two Nichols Herreshoff furnaces which recondition an average of 14 tons per hour.

Reclaiming sand "the Nichols Way" is simple, economical and dependable. A Nichols sand reclaiming plant is a complete unit for conveying, thermal processing, sizing and dust collection.

These units are built in a wide range of sizes to handle large or small tonnage.

Ask a Nichols Engineer for additional information.

Business Week • July 15, 1944

Sand Reclaimed

Dodge Chicago process of molding castings of aluminum and magnesium makes possible recovery of 98% of the sand.

The Chicago aircraft engine plant operated by the Dodge division of Chrysler Corp. faced the problem of obtaining sufficient sand for molds and cores for its huge aluminum and magnesium foundries. When running at capacity, the foundries each month pour 5,000,000 lb. of aluminum and 3,000,000 lb. of magnesium—more than any similar foundry in the world

• **Reclaiming Is Accelerated**—This, of course, required additional oven capacity. But it allowed the use of the same sand for both cores and molds. Having only the one type of sand to reclaim eliminates the problem of segregation for reconditioning, making it possible to reclaim as high as 98% of the sand

A trend toward reclaiming sand, instead of bringing in new sand for each pouring, was accelerated by the war. New foundries which were built to appease war's great appetite for castings installed reclamation units to save money, lessen the burden on transportation facilities, assure an adequate supply of sand, and eliminate the used sand disposal problem.

• **Furnaces Modified**—Two Nichols Herreshoff furnaces, designed originally to roast zinc and other ores, underwent slight modifications providing conveyors needed for reclaiming sand. Each furnace can recondition an average of 14 tons an hour. With one operating in the magnesium foundry and the other in the aluminum, the annual reclamation capacity is 471 carloads of sand. To care for expected production increase, another furnace is being installed in the aluminum foundry.

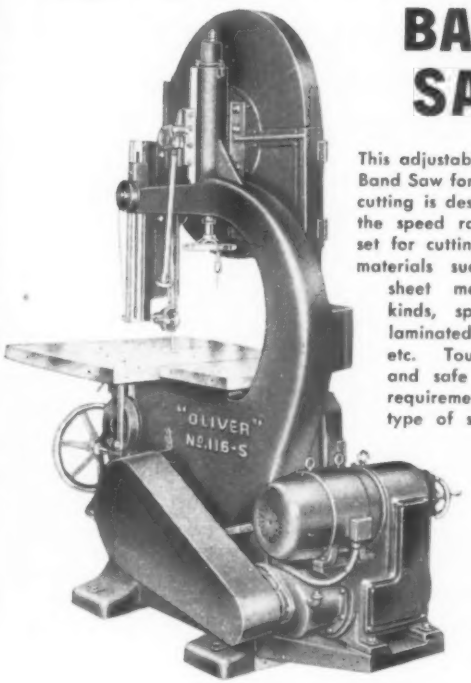
An hour and a half after entering the furnace, the sand emerges from the cooler on to conveyor belts to be taken to storage bins ready for reblending and reuse. Dust collectors over the furnace and the cooler have removed the fines (grains too small to be used).

NERCO

NICHOLS ENGINEERING & RESEARCH CORPORATION

60 WALL TOWER BLDG., NEW YORK 5, N. Y. • UNIVERSITY TOWER BLDG., MONTREAL, P. Q.

"OLIVER" METAL CUTTING BAND SAW



This adjustable speed, 36" Band Saw for special metal cutting is designed so that the speed range may be set for cutting almost any materials such as: steel, sheet metals of all kinds, sprue, plastics, laminated materials, etc. Tough, rugged and safe it meets all requirements for this type of saw.

A complete line of Band Saws. Write for literature.

Oliver Machinery Company
Grand Rapids 2, Michigan, U.S.A.
HIGH GRADE MACHINERY

PENN DUMPING BUCKETS

No. 5-A

Careful balancing makes Penn Buckets self dumping when loaded and self righting when empty. Careful construction prevents "clinging" makes them easily emptied.

WRITE TODAY FOR NEW BULLETIN DIMENSION SHEET AND PRICE LIST

PENN IRON WORKS
READING, PENNA.

ALL GRADES OF WASHED, DRIED, SCREENED

SILICA FOUNDRY SANDS

Produced from the celebrated Ottawa District St. Peter Sandstone.

Steel Molding Sand • Core Sand • Blast Sand • Furnace Bottom Sand • Opener Sand
Sand for Aluminum and Magnesium Castings • Silica Flour

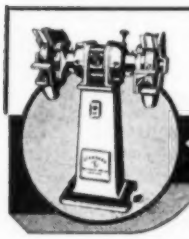
MICROSIL GROUND SILICA

STANDARD SILICA CORPORATION

CHICAGO AND OTTAWA, ILLINOIS

DISTRIBUTORS IN ALL PRINCIPAL CITIES

BLACKHAWK SILICA SAND



WE MANUFACTURE THE COMPLETE LINE!
SNAGGING GRINDERS • BUFFERS •
DUST COLLECTORS. ¼ H.P. TO 50 H.P.
WRITE FOR CATALOG NO. 11 TODAY

The STANDARD ELECTRICAL TOOL Co.
CINCINNATI - 4 - OHIO
2507 RIVER ROAD

HARDWOOD CHARCOAL

FOR GENERAL FOUNDRY USE
In lump and various forms

McDONALD CHARCOAL COMPANY
ARGYLE, MISSOURI

WILLIAMS "HOOK-ON" SINGLE LINE BUCKET

SPECIAL TYPE *for* FOUNDRY SERVICE

The Williams "Hook-on" Single Line Bucket is designed especially for foundry service in ⅜ to 2 cubic yard capacities. Its many features of design and construction are described in an illustrated bulletin sent free on request. Write

THE WELLMAN ENGINEERING CO. • CLEVELAND, OHIO

FOR SALE

Gray Iron Foundry, Pattern Shop, Machine Shop and complete manufacturing business. Now manufacturing complete line of farm machinery repair parts serving largest distributors and many dealers. Convenient shipping facilities. Employing from seventy to one hundred workers. Excellent sales outlets established. Location Central U. S. Postwar and expansion plans under way. Owner wishes to retire but could arrange part time supervision. Valued at $250,000. Will sacrifice. Purchaser must have cash and working capital.

Replies confidential.

Address Box 649

The FOUNDRY, Cleveland 13, Ohio

There Is No Compressed Air Condition So Bad In Any Factory That We Cannot Correct and Completely Remedy

WATER removed from AIRLINES AUTOMATICALLY with the MURPHY SEPARATOR

Sizes ½" to 4" Pipe

Literature and Prices on request

RESULTS . . . . . GUARANTEED
NO ABSORBENTS . NO CHEMICALS
AFTERCOOLERS . . . SPRAYERS

JAS. A. MURPHY & CO.

HAMILTON, OHIO

Classified Advertising

Help Wanted

REQUIRED FOR STEEL FOUNDRY

Superintendent

Foremen for cleaning room, molding and other departments

Personnel Director

Cost Accountant

Chief Timekeeper

Chief Inspector

Research Engineer to analyze causes for scrap, thorough knowledge of gating necessary

BOX 651

The FOUNDRY CLEVELAND 13, OHIO

GENERAL FOUNDRY SUPERINTENDENT

With experience on grey iron castings, aluminum castings and steel castings, in both jobbing and production, well versed in cupola, molding, coremaking, cleaning and working from blueprints. Must be energetic, capable, have a thorough technical knowledge of producing quality pressure or alloy castings, both ferrous and nonferrous. Capable of engineering complete plant layout. Must be able to hold organization and deal with present day conditions. Address: Box 621, The FOUNDRY, Cleveland 13, Ohio.

INDUSTRIAL MANAGER WANTED

A Brass Foundry and Machine Shop on the West Coast has need for an energetic young man to take charge. Must be entirely familiar with practice, have a technical or engineering background of design, costs, etc. and have vision to develop future products. Plant now employs 80 people and running to capacity successfully, but an opportunity is available to someone with the right qualifications for the future. Kindly state references, qualifications, personal data and expectant requirements. A man now employed as assistant in similar industry from Eastern practice preferred. Address: Box 588, The FOUNDRY, Cleveland 13, Ohio.

COREROOM FOREMAN

Experienced in coremaking in foundry. Capable of handling men and setting rates. Excellent postwar opportunity. Reply giving full details, age, experience, salary desired. Replies held confidential.

BOX 569

The FOUNDRY CLEVELAND 13, O.

MALLEABLE IRON FOUNDRY CLEANING ROOM FOREMAN

Operating one air furnace in conjunction with a Steel Foundry. 400 tons per month capacity Must be qualified to take charge of Hard and Soft Iron Cleaning, Grinding, Chipping, Packing and Annealing. A permanent position for a competent man. State qualifications, experience, and salary expected. Location southwestern Michigan. Address: Box 635, The FOUNDRY, Cleveland 13, Ohio.

GRAY IRON FOUNDRY FOREMAN

GRAY IRON FOUNDRY IN NORTHERN OHIO HAS PERMANENT AND POSTWAR POSITION OPEN FOR FOREMAN WITH GENERAL ROLL-OVER EXPERIENCE ON BOTH PRODUCTION AND SEMIPRODUCTION CASTINGS. MUST BE ABLE TO READ BLUEPRINTS SALARY AND PRODUCTION BONUS. WRITE GIVING FULL INFORMATION AS TO QUALIFICATIONS AND SALARY EXPECTED. CERTIFICATE OF AVAILABILITY NECESSARY. ADDRESS: BOX 556, THE FOUNDRY, CLEVELAND 13, OHIO.

Help Wanted

WANTED

STEEL FOUNDRYMEN

Large steel foundry located in Midwest is interested in contacting men experienced in all phases of foundry operation for supervisory and administrative positions. Statement of availability essential. All correspondence confidential.

ADDRESS: BOX 584, THE FOUNDRY, CLEVELAND 13, OHIO

GREY IRON FOUNDRY FOREMAN

Medium sized foundry in the Twin Cities area has a permanent and postwar position open for a practical foundryman who has experience in all phases of moulding modern sand mixes, high tensile strength irons, and has the ability to read prints and get production. Give full information as to past work, salary expected, schooling and certificate of availability. Address: Box 618, The FOUNDRY, Cleveland 13, Ohio.

SALESMEN OR SALES ENGINEERS

By old establishment for postwar sales of Beryllium Copper and other Special Nonferrous Alloy Castings.

BOX 625

The FOUNDRY CLEVELAND 13, OHIO

MELTING AND POURING FOREMAN

MEDIUM SIZE FOUNDRY IN CLEVELAND HAS FINE OPPORTUNITY FOR A MAN WELL VERSED IN CUPOLA PRACTICE AND WITH ABILITY TO HANDLE POURING AND SHAKE-OUT CREW. PERMANENT POSITION. SALARY AND PRODUCTION BONUS. IN ANSWERING GIVE FULL INFORMATION AS TO PAST WORK, STATE FULLY QUALIFICATIONS AND SALARY EXPECTED. CERTIFICATE OF AVAILABILITY NECESSARY. ADDRESS: BOX 558, THE FOUNDRY, CLEVELAND 13, OHIO.

ATTENTION SALESMEN!

Representatives now calling on foundries regularly are wanted by a well-known manufacture of high grade line of plumbago, facings, parting, blacking, core wash and allied foundry items. Liberal commission basis. Please advise territory covered, lines now handled, experience with foundry items, etc. Address Box 217, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY FOREMAN

Gray Iron Jobbing and Production Shop manufacturing Light—Medium—Heavy Work.

If you are a thoroughly experienced and a progressive foundryman, under 45 years of age and interested in a permanent future with a growing foundry, write:

BOX 629

The FOUNDRY CLEVELAND 13, OHIO

FOUNDRYMEN

A postwar job is awaiting a man who can run a gray iron foundry. Requirements are: Practical molding and coremaking experience; good knowledge of cupola operation; good organizer; knowledge of foundry costs. Also nonferrous foundryman for medium size foundry. Address: Box 622, The FOUNDRY, Cleveland 13, Ohio.

SALESMEN

Two (2) Salesmen wanted by large eastern jobbing foundry making iron and bronze castings. One salesman who has specialized in bronze castings, and the other who has specialized in alloyed iron castings, including high silicon, chrome and nickel alloys, and is familiar with their applications. Give complete details of past employment, age, salary and availability. Address: Box 583, The FOUNDRY, Cleveland 13, Ohio.

ASSISTANT SUPERINTENDENT OR FOREMAN

By large gray iron jobbing foundry in Illinois. Must have metallurgical and general foundry experience on medium and heavy castings. Give age, training, experience and salary desired. Address: Box 564, The FOUNDRY, Cleveland 13, Ohio.

CLEANING ROOM FOREMAN

For steel foundry—Castings up to 1500 pounds. Subject to rigid inspection. Must have good record in handling all types of labor, to get out production. Philadelphia district. Address: Box 585, The FOUNDRY, Cleveland 13, Ohio.

WANTED

Eastern Pennsylvania Steel Foundry has permanent opportunity for a steel foundry foreman familiar with modern methods of producing green and dry sand castings, ranging in weight from twenty-five (25) pounds to fifty (50) tons. Address: Box 510, The FOUNDRY, Cleveland 13, Ohio.

EXECUTIVE WANTED

Aggressive man over 35 who has leadership and organizing ability as well as foundry and machine shop knowledge. Opportunity to secure interest in our firm for the right man as our plant is young and growing most rapidly with great postwar possibilities manufacturing our own products as well as a jobbing business. Huntington, W. Va. area. Address: Box 632, The FOUNDRY, Cleveland 13, Ohio.

WANTED

Pennsylvania Steel Foundry producer of green and dry sand castings ranging in weight from five (5) pounds to fifty (50) tons, has a permanent opportunity for Production Engineers, Rate Setters, Adjusters and a Sand Engineer familiar with mixtures and application. Address: Box 444, The FOUNDRY, Cleveland 13, Ohio.

Classified Advertising

Help Wanted

ENGINEERS (TESTING)

Mechanical experience with air pump, accessories and hydraulic testing preferred. Large New York Metropolitan manufacturer. State experience fully.

BOX 850
REALSERVICE, 110 WEST 34th ST.
NEW YORK, N. Y.

COREROOM FOREMAN

For Steel Foundry operating one acid open-hearth and one acid electric furnace, producing 700 tons of steel castings per month ranging from 1 lb. to 10 tons. Employ 20 coremakers. Located near Chicago. This is a permanent position for a competent man. Please give qualifications and salary expected first letter. Address: Box 636, The FOUNDRY, Cleveland 13, Ohio.

PLANT SUPERINTENDENT

For Malleable Casting Foundry located in the East, employing 35 to 40 molders with a total of approximately 150 men. Must be experienced Malleable Iron man, understanding Melting, Annealing, Molding and Coremaking. State age, experience, family and approximate salary desired. The position is open for immediate acceptance for suitable applicant. Company has good financial position with excellent peace time connections. Address: Box 574, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY FOREMAN

GRAY IRON FOUNDRY IN CLEVELAND DISTRICT HAS OPPORTUNITY FOR FOREMAN FOR POURING SHAKE-OUT AND SAND CONDITIONING. PERMANENT POSITION. SALARY AND BONUS. PLEASE GIVE FULL INFORMATION AS TO PREVIOUS WORK, QUALIFICATIONS AND SALARY EXPECTED. CERTIFICATE OF AVAILABILITY NECESSARY. ADDRESS: BOX 557, THE FOUNDRY, CLEVELAND 13, OHIO.

SAFETY ENGINEER

With foundry experience by large gray iron jobbing foundry in Illinois. Give age, training, experience and salary desired. Address: Box 565, The FOUNDRY, Cleveland 13, Ohio.

SUPERINTENDENT

Well established Nonferrous Metal Foundry in Milwaukee area. State age, experience, salary expected. Good opportunity for right man. Address: Box 630, The FOUNDRY, Cleveland 13, Ohio.

PNEUMATIC TOOL SALES ENGINEER

Old established manufacturer of Pneumatic Tools require the services of several district sales engineers. Mechanical training and experience essential. Sales experience also desirable. Those selected will be given shop training before permanent assignment to territory. Give complete record of experience and education. Address: Box 600, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY FOREMAN

We want to get in touch with foundry foreman or shop owner who can produce plated nonferrous casting work at minimum cost. Have postwar production work to place. Might favorably consider taking financial interest with right man. Address: Box 640, The FOUNDRY, Cleveland 13, Ohio.

WANTED

Steel and gray iron molders
Union shop
N. & S. FOUNDRY COMPANY,
SEATTLE, WASH.

GRAY IRON FOUNDRY SUPERINTENDENT

Must have practical experience in moulding, rigging, core work and also be able to read blue prints. Please give age, references, wages expected and if willing to work in Milwaukee, Wisconsin territory. If you're not able to meet above qualifications, please do not apply. Address: Box 639, The FOUNDRY, Cleveland 13, Ohio.

WANTED

Foreman, Annealing Department, malleable foundry in Middle West. Give full particulars regarding age and qualifications. Address: Box 577, The FOUNDRY, Cleveland 13, Ohio.

Help Wanted

MOLDING SUPERINTENDENT or GENERAL FOREMAN

For Midwestern Malleable Foundry to assume full charge of Molding Department, including supervision of molding and labor foreman. Permanent. Address: Box 610, The FOUNDRY, Cleveland 13, Ohio.

COREROOM FOREMAN

For Brass and Aluminum Jobbing Foundry. Located in Northern Indiana. Definite postwar employment. Write giving age, qualifications, experience, marital and draft status, when available and salary expected. Address: Box 654, The FOUNDRY, Cleveland 13, Ohio.

Positions Wanted

SUPERINTENDENT

A practical Aluminum and Magnesium foundryman with 14 years of broad experience in green and dry sand molding. University graduate, B.S. degree M.E. Formerly employed by War Department as foundry engineer and have developed and obtained a knowledge that is equalled by only a few foundry men on nonferrous metals. Have complete knowledge of sand mixtures, gating, risering, etc., chilling of jobbing castings, organizing abilities, incentive plans and labor relations, and production. Desires position either in Cleveland, Detroit or near by vicinity. Available in 30 days. Address Box 637, The FOUNDRY, Cleveland 13, Ohio.

NONFERROUS FOUNDRY SUPERINTENDENT

Broad practical experience including steam valves, high pressure castings, chilled castings and general jobbing and production work. Prefer position with manufacturing plant. Address: Box 601, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERVISOR

Practical grey iron foundryman. Well trained for high class supervisory, technical and executive position in a grey iron foundry organization. Twenty-five years' broad experience producing quality castings, light, medium and heavy. Machine tool, engine, general jobbing and production. Well versed in cupola operation, metallurgy and foundry costs. Experienced with incentive system, sales, contact, expediting, personnel and foundry safety work. Neat appearing and pleasing personality. Middle age. Address: Box 648, The FOUNDRY, Cleveland 13, Ohio.

WEST COAST FOUNDRY SUPPLY & EQUIPMENT SALESMAN

Wishes to represent firm in Southern California. Twenty years' selling experience. A-1 references Office and stockroom in Los Angeles. Available. Address: Box 614, The FOUNDRY, Cleveland 13, Ohio.

SALES TECHNICIAN OR CONTACT MAN

Technically and practically trained with background of fifteen years' experience in every capacity relative to the production of steel castings. Well versed in metallurgy and sales technic. Desires connection with progressive firm with postwar future. Will relocate anywhere in Midwestern States. Correspondence in confidence. Address: Box 634, The FOUNDRY, Cleveland 13, Ohio.

GRAY IRON FOUNDRYMAN

A practical gray iron foundryman of 40 years' experience producing quality castings, well versed in green and dry sand molding machines, rigging for production, cupola, cores, etc. Have run successfully some of the best foundries in the United States. Am available at once. Prefer Pacific Coast. Address: Box 450, The FOUNDRY, Cleveland 13, Ohio.

GENERAL MANAGER
MATURE, CAPABLE, AGGRESSIVE DEPENDABLE

With a record that assures you that he can and will manage your business energetically and safely and develop its possibilities fully and profitably. Broad experience in foundry, machinery and allied lines. Making good in present position, but qualified for larger responsibility. Correspondence in confidence. Address: Box 638, The FOUNDRY, Cleveland 13, Ohio.

Positions Wanted

SUPERINTENDENT or METALLURGIST

EIGHTEEN YEARS' EXPERIENCE. PRACTICAL AND TECHNICAL CONTROL. ALL PHASES FOUNDRY OPERATIONS—CARBON, ALLOY AND MANGANESE STEEL (CASTINGS AND INGOT PRODUCTION). QUALIFIED CHEMIST, METALLURGIST, ELECTRIC FURNACE MELTER (ACID AND BASIS PRACTICE) WITH FULL PRACTICAL AND TECHNICAL KNOWLEDGE OF ALL FOUNDRY OPERATIONS. DESIROUS OF POSITION IN MEDIUM SIZED ELECTRIC STEEL FOUNDRY WITH GOOD POSTWAR PROSPECTS. ADDRESS: BOX 619, THE FOUNDRY, CLEVELAND 13, OHIO.

PATTERN ENGINEER

Desires position in Magnesium or Aluminum Plant where his vast knowledge of Pattern Fabrication and efficient foundry operation can be fully utilized. Married, twenty-seven years' experience, at present employed. Address: Box 633, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY EXECUTIVE

Desires a permanent position. Has years of managerial and practical shop experience both in molding and finishing of the product. Has a reputation for developing new methods and ideas. Forty years of age, married and family. Address: Box 611, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY MAN

A metallurgically trained and foundry experienced steel casting producer wishes to join a foundry organization where efforts, know-how and results are desirable traits. Possesses knowledge and experience to run the foundry from the melt to the finished casting. Alloys or carbon steels. Have had opportunity aiding the complete conversion of an ordinary foundry into one of the most modern. An excellent labor relations record with several hundred men. The best of management relations. Can offer best references from management, labor and U. S. ordnance for work performed. Address: Box 620, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT OR GENERAL FOREMAN

Thirty years' foundry experience of which has been superintendent and general foreman for twenty years on jobbing machinery, castings and practical foundryman in every detail. New Jersey preferred. Best references. Address: Box 644, The FOUNDRY, Cleveland 13, Ohio.

GRAY IRON SUPERINTENDENT

Twenty-five years' experience as gray iron superintendent. Both practical, technical and efficient in all departments of foundry labor relations, etc. Married, good health. Available and references. Address: Box 641, The FOUNDRY, Cleveland 13, Ohio.

GRAY IRON METALLURGIST

Experienced in production of high-test gray iron and sand control wishes position with postwar possibilities. Address: Box 642, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

Iron—steel—nonferrous. Up to date. Practical and technical. Handle fully any size. American, age 60, West coast preferred. Address: Box 624, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

Employed, desires position with concern in Central or Southern New England. Vast experience in green and dry sand. Modern coreroom and cupola practice. Very good reasons for desiring change. Address: Box 613, The FOUNDRY, Cleveland 13, Ohio.

BRASS FOREMAN OR SUPERINTENDENT

Good metal mixer. Practical experience in all brass departments. Also experience in plaster of paris molding nonferrous. Address: Box 645, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY CONSULTANT

A practical foundryman, with many years' experience in gray iron jobbing foundries making medium and heavy castings, is open for a position as Superintendent or Consultant, thoroughly familiar with all foundry practice, including cupola and sand control. Address: Box 647, The FOUNDRY, Cleveland 13, Ohio.

Classified Advertising

Positions Wanted

SALESMAN or FOUNDRY SUPERINTENDENT

Age 32, single, 12 years' background. Foundry metallurgist, labor and melting foreman, trouble shooter, laboratory assistant, sand control. Experience in grey iron, malleable magnesium. Now employed but available. Address: Box 656, The FOUNDRY, Cleveland 13, Ohio.

SALES REPRESENTATIVE

Twenty-two years of steel foundry experience. Six years as sales representative covering New England, New York and Philadelphia territories. Forty-two years of age, married. Present connection unsatisfactory. Address: Box 650, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

Fully experienced in nonferrous metals—light, medium and heavy castings, rigging, gating, cost estimating. Neat appearing and aggressive. Age 43. Thorough experience as foundry superintendent. Experience including steam valve high pressure casting aluminum, brass bronze, nickel, copper, aluminum bronze, silicon bronze and high manganese bronze casting. Employed. Address: Box 655, The FOUNDRY, Cleveland 13, Ohio.

SUPERINTENDENT

Practical gray iron foundryman, technically trained with 25 years' broad experience from molder to superintendent producing quality castings in machine tool, machinery and high production work. Well versed in green and dry sands, molding machines, cores, sand control and cupola. Would like to contact reliable firm with good sized foundry that is in need of the services of a high grade foundryman. Age 46. Address: Box 653, The FOUNDRY, Cleveland 13, Ohio.

SUPERINTENDENT

Practical gray iron foundryman, age 45 with 25 years' broad experience from molder to superintendent in general jobbing and high production. Well versed in continuous melting, green sand, dry and pit work, sand control, rigging for molding machines, cores and cupola control. Would like to make a connection with good reliable firm that has opening for a high grade foundryman. Address: Box 652, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

Nonferrous man who throughout his career has made a constant study of this field, and is well informed as to the most up-to-date methods used in the production of castings. Not in just for the ride. Can go anywhere. Address: Box 593, The FOUNDRY, Cleveland 13, Ohio.

Employment Service

SALARIED POSITIONS

This advertising service of 34 years' recognized standing negotiates for high salaried supervisory, technical and executive positions. Procedure will be individualized to your personal requirements and will not conflict with Manpower Commission Retaining fee protected by refund provision Identity covered and present position protected Send for details.

R. W. BIXBY INC.
101 Delward Bldg. Buffalo, N. Y.

GRAY IRON FOUNDRY EMPLOYMENT

We are receiving many inquiries for superintendents, metallurgists and foremen. We shall be glad to hear from qualified men. No charge.

Gray Iron Founders' Society Inc.
1010 Public Square Building Cleveland, Ohio

Opportunities

OPPORTUNITY

We will have postwar production work for nonferrous foundry. If you have modern equipment suitable for quantity production of plated work and want postwar business, address: Box 623, The FOUNDRY, Cleveland 13, Ohio.

Opportunities

Wanted to contact a grey iron foundry in Eastern Ohio or Western Pennsylvania who would be interested in taking on line of medium weight (500 lb.) casting as a postwar proposition that will require quantity production. Address: Box 643, The FOUNDRY, Cleveland 13, Ohio.

Wanted-To-Buy

WANTED

A good used sand cutter, electrically driven, A. M. 69/45 or 74/50 or equal.

Advise delivery, location, age and condition.

COAST FOUNDRY COMPANY
VANCOUVER, B. C.,
CANADA

WANTED

Used Tabor-abrasive cut off machine Type C5AC or C7½AC, 220 volt, 3 phase, 60 cycle, AC motor. Address: **AMERICAN MARINE BRASS FOUNDRY, 22 BERRIMAN ST., BROOKLYN 8, N. Y.**

WANTED

Used 48 x 72 American Wheelabrator Tumblast, or a comparable size Pangborn Machine. This machine should be complete with loader and spare parts if possible. Please give us your price, terms and delivery. Address: **BOX 626, The FOUNDRY, CLEVELAND 13, OHIO.**

WANTED

A small foundry or foundry and machine shop located in northwestern part of Ohio or northeastern part of Indiana. Reply: Box 627, The FOUNDRY, Cleveland 13, Ohio.

MIXERS WANTED

Used Simpson Intensive Sand Mixers. State size, condition and lowest cash price for immediate acceptance. Address Box 578, The FOUNDRY Cleveland 13, Ohio.

SECOND-HAND COAL OR COKE CONVEYOR

Wanted to move material about fifty feet from railroad car to foundry. Address Box 596, The FOUNDRY, Cleveland 13, Ohio.

Foundry Service

CHEMICAL

Metallurgical chemist, 15 years experience has well-equipped laboratory—wants analytical work—metals, alloys. LOW WEEKLY RATE. 24-hour service. Reply: DAVID W. BLACK COMPANY, 1553 W. MADISON, CHICAGO 7, ILL.

Foundry Work Wanted

WANTED

Have available capacity for bronze and aluminum castings from jobber or manufacturer. Long experience in this line. Wire or write: Box 646, The FOUNDRY, Cleveland 13, Ohio.

For Sale

AIR COMPRESSORS

BELTED—176 ft., 355 ft., 540 ft., 676 ft., 752 ft. & 1300 ft.
ELECTRIC—355 ft., 528 ft., 676 ft., 807 ft., 1302 ft., 1723 ft., 2022 ft., 2200 ft., 2800 ft., 3600 ft., & 5000 ft.

STEEL TANKS

9—5000 gal., 11,500 and 18,000 gal. cap.
17—1000 bbl., 4000 bbl. and 10,000 bbl. cap.

TANKS BOUGHT AND SOLD
R. C. STANHOPE, INC.
60 East 42nd St. New York, N. Y.

For Sale

SPECIAL VICTORY BARGAINS

Cast Iron and Steel Plate Mill-Dust & Shavings Exhausters 50 in stock. **Cupola and Furnace** Blowers for Coke, Oil or Gas Combustion.
1—Spencer Blower 2250 C.F.M.—1½ lbs.—25 H.P. 3/60/220 or 440 A.C.
2—Sprague 4 Ton Electric Hoists 115 V. D.C.

MELTING FURNACES

2—Walker-York coke fired crucible furnaces for up to No. 70 crucibles—blowers attached.
1—US Rotary No. 3—Melting or Smelting.
1—Pair Monarch-Rockwell's—Rotating, each 500 lbs. cap. mounted together on base, oil burners available, when used together waste heat from one preheats other.
1—Hausfeld open flame, non crucible 400 lbs. brass capacity or equivalent volume for Aluminum.
1—Stationary for No. 70 crucible.
Tumbling Mills—1 cast iron for brass cleaning.
1—Sly 48" x 60"—1" thick round steel shell.
Core Ovens: Small portable, insulated.
1—Blystone—7 cu. ft. capacity size sandmixer.
1—8 ft. size No. 3 Simpson (Muller type) Sand Mixer.
Molding Machines:
1—"Rapid" Portable Jolt-Squeezer, Platen—16" x 21".
1—"Herman" 60" x 70" Plain Air Jolt Table 6000 lb. lift capacity.
1—Battenfeld stationary 12" cyl. plain squeeze
1—Arcade portable plain air squeeze 12" cyl.
1—Osborn No. 405 stationary jolt-rollover draw.
1—International 26" x 36" type F jolt-rollover-draw.
1—Tabor all hand operated Portable 24" x 36" rollover, 8" draw.
Compressors:
Bury—12" x 10" modern valves—358' cap.
1—Chicago 12" x 8" 240' cap., 70 lbs.
Gardner 4½" x 4½" Vertical 19'.
Tested-air receivers—12" up to 36" dia.

CLIFTON MACHINERY CO.
1023 W. 6TH, CINCINNATI 3, OHIO

REBUILT USED EQUIPMENT

Molding machines, all types; tumbling mills; furnaces; cupolas; air compressors; hoists; rammers, all types; ladles, all types; sand mixers; sand blast tanks; core machines, etc. All equipment rebuilt and guaranteed. All sizes used steel flasks.

HAYNES FOUNDRY EQUIPMENT COMPANY
1734 Lake St. Kalamazoo 21, Mich.

FOR SALE

One second hand Stedman Type "B" 24" x 20" Rolling Ring Crusher with Chilled Liners, Manganese Rings and Cage Bars, Cast Iron Construction. Also one second hand Stedman Type "B" 24" x 20" Rolling Ring Crusher arranged for flat belt drive, all steel construction, having cast steel housing and liners. Machines in good operating condition and may be inspected at our plant.

BIRDSBORO STEEL FOUNDRY & MACHINE COMPANY
BIRDSBORO, PA.

FOR SALE

Booth Type 10R 1,000 pound capacity Electric melting furnace complete with all operating mechanism, control board and transformer.

An opportunity to get an electric melting furnace at a fraction of its original cost.

THE PRIME MFG. CO.
1669 S. 1st ST. MILWAUKEE 4, WIS.

FOR SALE

1—3000 pound Whiting U shaped Teapot Ladle, like new. Address: Box 586, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE

1—Type BB 1, Size 225, Serial No. 563, Fisher Crucible Furnace, with 7 new crucibles. In excellent working condition. Call or write Kelly Foundry & Machine Co., Elkins, W. Va.

FOR SALE CHEAP

Chemical laboratory equipment suitable for iron analysis, includes two balances, electric furnace, glassware, etc. Address: E. M. Heartlein, Galva, Ill.

Classified Advertising

For Sale

REBUILT EQUIPMENT IN STOCK
IMMEDIATE SHIPMENT

(2)—¾" cap. Power Sprue Cutters.
(1)—10" Tabor Post Type Squeezer.
(2)—Heavy Duty double end U. S. Elec. Grinders 440-V-3-Ph-60-cy.
(1)—Pangborn type GD size No. 3 Sand Blast Barrel.

ELECTRIC MONORAIL HOISTS

Cap.	Make	Current	Remarks
(1)—¼-ton	Detroit	220/3/60	Var. Speed
(1)—1-ton	Lofted	220/3/60	Single Speed
(2)—1-ton	Euclid	115-VDC.	Single Speed
(3)—1-ton	Shepard	230-VDC.	Var. Speed
(3)—2-ton	Shepard	230-VDC.	Var. Speed
(3)—2-ton	Shepard	230-VDC.	Two Motor
(1)—4-ton	Shepard	230-VDC.	Two Motor
(1)—6-ton	Sprague	230-VDC.	One Motor

SPECIAL: 2—1-ton Shepard Hoists, arranged for stationary mounting, 7½-HP. motor, 220/440-VAC. Var. Speed, separate controller. 32-ft. of cable, suitable for use as winches, car puller to operate furnace doors or elevator.
SPECIAL: 2—7¼-ton Shepards, Fl. or Cage Operated, 230-VDC., 20-HP. hoist motor, 28/70-FPM. 10-HP. trolley motor, 350/400-RPM 40-ft. lift.

AIR COMPRESSOR

(1)—9 x 8 Chicago, N.S.B., cap., 178-CFM @ 100 lbs. with 25-HP., 220/440-VAC. motor and control.

BUCKETS

(2)—¾-yd. Hayward Electric 220-VAC.
(2)—1½-yd. Hayward Electric 230-VDC.
SPECIAL: 3-ton Size "P" Electromelt Steel Melting Electric Furnace, complete with 1500-K.V.A., Allis-Chalmers O.I.W.C. Transf. 13200/3/60-cy., all necessary control equipment, panels, etc. REBUILT, GUARANTEED, IMMEDIATE SHIPMENT.

OVERHEAD ELECTRIC TRAVELING CRANES

Tons	Make	Span	Current	Remarks
(1)—2	Shepard	30'11"	230-VDC.	FL.OP.
(1)—3	Shaw	30'0"	230-VDC.	FL.OP.
(1)—4	Shepard	30'11"	230-VDC.	FL.OP.
(2)—5	Niles	24'0"	220-VAC.	FL.OP.
(1)—5	Box	40'0"	A.C. or D.C.	CG.OP.
(1)—5	Niles	40'0"	230-VDC.	CG.OP.
(1)—10	Bedford	48'0"	230-VDC.	CG.OP.
(1)—10	Erie	45'6"	440-VAC.	CG.OP.
(1)—10	Whiting	80'0"	220/440-VAC.	CG.OP.
(1)—10/3	Northern	80'0"	220-VAC.	CG.OP.
(1)—10/3	Northern	46'0"	220/440-VAC.	CG.OP.
(1)—15	Morgan	52'3"	230-VDC.	CG.OP.
(1)—20	Northern	64'0"	220-VAC.	CG.OP.
(1)—35	Northern	64'0"	220-VAC.	CG.OP.

WE OWN AND HAVE ALL THIS EQUIPMENT IN STOCK. IT IS OFFERED REBUILT IN OUR LARGE MODERN PLANT AND FULLY GUARANTEED.

T. B. MacCABE CO. 4304 CLARISSA ST
PHILADELPHIA 40, PENNA.

FOR SALE

Cleveland model F sand cutter, No. 670, type 112-92, 84" spiral cutting cylinder, 36" in diameter, 101" between wheels, 5" wide, 6' diameter, equipped with 5 motors, 2 speeds forward, 2 speeds reverse 3-phase 60 cycle, 220V, AC Cable and Take up reel. Condition good.

American Machine Company 36 x 42 tumbling unit, serial A 5841. Bearings and motor newly reconditioned.

GILLETT & EATON, INC.

LAKE CITY MINNESOTA

REBUILT
BLOWERS—FANS—EXHAUSTERS

Roots-Connersville positive cupola blowers. Centrifugal blowers for gas and oil burning. Sand blast, grinder end dust exhausters. Ventilating fans.

GENERAL BLOWER COMPANY
404 N. Peoria St. Chicago, Ill.

FOR SALE

WELDING, CUTTING EQUIPMENT. Torches, Regulators & Gauges, Aircraft Welding Outfits and Torches, Lead Welding Outfits and Torches, Soldering Outfits, Acetylene Generators, Supplies, Electric Arc Welders, Electrodes.

SUPERIOR OXY-ACETYLENE CO.
HAMILTON, OHIO

For Sale

FOR SALE

1½ Hsp. Type M 7A Strand Flexible Shaft Grinder: 8 by 1½ by ¾ Wheels; High Speeds 2500-3500-4500 RPM; 220 V, 3 Phase, 60 Cyl. AC; Mounted on 4 wheel Truck and Swivel Base with all standard attachments Like New.

2 Johnston Pressure Blowers with Motors:

(a) Size No-510 Blower with 5 Hsp. Motor, Capacity 1250 CFM 10 oz. Pressure.

(b) Size No-112 Blower with 1½ Hsp. Motor, Capacity 200 CFM, 12 oz. Pressure.

Lewis No. 7 Core Wire Straightener & Cutter Machine with GE ½ Hsp. Motor, 345 RPM, 60 cy., Capacity Up to ¼" diameter wire 1" to 12" 220 Volt, 3 Phase; Height Over all 18¼"; long; Speed 80-6" pcs. per minute; Operate by hand or by motor.

Adams Cherry Easy Lift Off Wood Flask; Size 14 by 14 with 8½" cope, 3" Drag, 4° Taper. One ¾" Round Pin and one ¾" Hex Pin with bushing pin centers 17¾".
Nine 14" by 14" by 9" deep Cast Iron Jackets, 4° Taper; Jackets extend 1¾" on Drag, 7¼" on Cope.

Whiting Wishbone Charger & Buckets.
Modern 400" Cylindrical Ladles with Cover.

PAUL PUFAHL & SON FOUNDRY
COMO AVENUE, S. E., and CITY LIMITS
MINNEAPOLIS 14 MINN.

FOR SALE

2—25 Ton Whiting Cupolas
Overhead Electric Cranes and Hoists
Trolleys, Monorails and Runways

N. B. PAYNE & CO., INC.
105 W. 55th St., New York 19—Tel: Circle 7-6730

FOR SALE

Heroult 2 ton electric melting furnace complete with 1500 KVA-G. E. Transformer Westinghouse controls. Can be seen in operation. Address: Box 628, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE

Tyler hummer electric screen unit—4 ft. by 5 ft. ton capacity top screen; 60 mesh stainless steel bottom screen. Complete with screens, vibrator and motor generator. Ready for operation. Address: Box 494, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE

7—Type "R" International hand roll, hand jolt, hand draw, all sizes.
1—Type "G" International, long model, 26 x 66".
1—Type "HJ" International, 20 x 6".
1—Type "HJ" International, 16 x 4".
3—Pridmore hand ram, hand roll, foot draw, rollover machines.
1—Tabor plain bumper, 5' square table.
1—Tabor pin strip machine, 32" x 32" table.
Tabor jolt strippers.
Nichols jolt squeezers.
3—Milwaukee jolt strip squeezers.
3—20" Combs electric riddles.
1—Gas fired ladle dryer, 10 burners.
1—Lockwood tier lift electric battery truck, 1 ton lift capacity.
26—Riveted steel skids.
1—Ingersoll-Rand 6 x 4 air compressor, motor and tank.
1—Curtis 6 x 6 air compressor, upright, motor and tank.
1—Tessemer sprue cutter.
1—20" Exhaust fan, motor driven, direct drive, practically new.
2—AA Model American sand cutters.
1—Beardsley & Piper sand muller, practically new.
1—52" Radial drill.
2—42" x 8' Sly tumbling mills, practically new.
2—30" x 56" Tumbling mills.
1—24" x 48" Tumbling mill, 1" shell.
1—36" x 60" Tumbling mill, 1" shell.
1—Stewart heat treat, gas fired, 5 burners on each side, open at each end.
1—Whiting 1½ ton tea-pot lip latest style pouring ladle.
2—2 ton Detroit cable air hoists.
1—Sly dust arrestor, new bags.
250 each—New core plates, ¾" thick, sizes as follows: 7½" x 10", 7½" x 12", 7½" x 14", 7½" x 16", 7½" x 18", 7½" x 20", 7½" x 22", 7½" x 24½".

HAYNES FOUNDRY EQUIPMENT COMPANY
1734 LAKE ST. KALAMAZOO 21, MICH.

For Sale

FOR SALE

No. 4 Stoney Shakeout Ball with two vibrators. This equipment is brand new and was originally purchased to handle crank case housings weighing up to 250 lbs.

1—Bucket elevator 25' c.c. inclined type with 4" x 6" buckets malleable type A attached on 56' of 6" belt and top pulley shaft and bearings, collars, large gear and drive shaft with keyed pinion and two bearings collars and flat drive pulley.

1—Tail pulley with shaft, 2 collars, 2 screw take up bearings.

2—Supporting frame idler pulleys, shaft and bearings.
This equipment was purchased by us and has been slightly used.

1—Steel Sand Hopper—7 ton capacity with steel frame work. Hopper constructed to feed both Cope and Drag Machines.
This equipment is new and complete specification drawings are available.

1—20 x 8 Roll-Over Core Machine. (used)

1—22 x 10 Rollover Core Machine. (used)

3—Pneumatic Air Sand Rammers (Floor) rebuilt.

6—Rubber Butts for Floor Sand Rammers (new).

1—Pneumatic No. 2 Master Chipping Hammer (used).

1—Pneumatic No. 2 Master Chipping Hammer (used).

1—Rotary Sand Blast Table (used). Manufactured by Sly Mfg. Co.
This equipment is in need of some minor repairs.

1—72" Whiting Cupola with new Whiting Skip Hoist. The Cupola has been used, but the Skip Hoist is new. Complete brick and cast linings available to line the cupola down to 48".

Ingersoll-Rand—Class J. C. Air Compressor, 500 cu. ft. capacity per minute
Right hand air cylinder 12" x 12".
Left hand air cylinder 18" x 12"
Right Hand Side No. 2819
Left Hand Side No. 2820, complete with Motor, Belt and

1—Westinghouse Safety Switch

1—General Electric Starting Box for 220 volt.

ANDERSON STOVE CO.
Anderson, Ind.

FOR SALE

Ruemelin Room Type Sand-Blast 10' x 10' x 8' with overhead Track and Bottom Track with Heavy Duty Track car. 10 cubic feet Blast generator with complete Blast material conveyor. No. 19 Clarage Exhaust fan. Unit practically new. Set up ready for operation. For further details contact **THE UCHTORFF COMPANY, 201 N. HOWELL STREET, DAVENPORT, IOWA.**

CENTRIFUGAL COMPRESSORS

7000 CFM, @ 1¼ lbs. pressure, Ingersoll-Rand, type F S, driven by a 60 HP, Westinghouse 220/440 volt 3600 RPM motor.
2100 CFM @ 12 oz. General Electric with 10 HP 220/440 volt 3450 RPM motor.

Pressure Blowers

(2) 1200 CFM @ 11 oz. Buffalo, 9½" intake, 7" x 7½" outlet, with 7½ HP 3/60/1800 RPM motors

THE MOTOR REPAIR & MFG. CO.,
1552 HAMILTON AVE., CLEVELAND, OHIO

FOR SALE

No. 24—42" Colliau Cupola, with wind pipes and roof saddle.
No. 4—American Blower and 7½ H.P. Motor.
Universal Squeezer and 2 No. 4 Gates.
Brake Shoe Molding Machine.
11-ft. Whiteway Pole Pattern and Core Boxes and heavy flasks.
2 Patternmakers Benches with Vises.
Equipment for 4 furnace Brass Shop—½ ton Electric Hoist.

A. C. OSBORN
VIRGINIA MINNESOTA

FOR SALE

Complete set of wood patterns for nine-inch cylinder molding machine, both portable and stationary, with blue prints covering machine work. Address: Box 603, The FOUNDRY, Cleveland 13, Ohio.

SCULLY Reconditioned Foundry Equipment

★ ALL SCULLY EQUIPMENT IS REBUILT AND OVERHAULED IN OUR OWN MACHINE SHOP

MOLDING MACHINES

JOHNSTON & JENNINGS

Jolt Roll-Over Draw Machines

No. 610, 24 x 30" table, 600 lbs. cap. @ 80 lbs. press., 10" pattern draw.

No. 815, 30 x 40" table, 1200 lbs. cap. @ 80 lbs. press., 15" pattern draw.

No. 918, 40 x 48" table, 2000 lbs. cap. @ 80 lbs. press., 18" pattern draw.

MISC. MOLDING MACHINES

No. 112 Arcade portable jolt roll-over and squeeze, pattern draw, table accommodates pattern plates up to 13 x 33"—9" draw, distance between uprights 36".

No. 28 Davenport jolt roll-over draw, 26¼ x 39½" table-pattern draw 12"—jolt cyl. dia. 8"—1500 lbs. cap. @ 80 lbs. press.

Pridmore 30 x 42" power turn-over and drop Electrically operated 24 x 32" jarring machine, 2 HP 220V AC Motor.

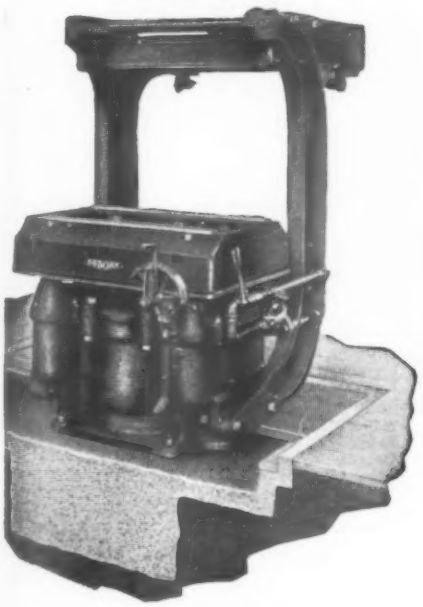
PLAIN AIR SQUEEZERS

Tabor stationary, 32" between rods, 10" dia. cyl. 18 x 18" table.

Davenport, 33" between rods, portable straddle type, 10" cyl. 14 x 20" table.

Tabor, portable, 32" between rods, 10" dia. cyl. 16 x 17" table.

OSBORN JOLT SQUEEZE & POWER STRIP



No. 703 OSBORN

(Similar to above excepting with roll-off)

No. 703-6 Osborn jolt squeeze and strip, 21 x 29" table, stationary. Length of opening in lifting frame 34", 6" pattern draw, 8" cyl. dia. 1000 lbs. jolting cap. @ 80 lbs. press. Distance from lifting frame to squeeze head 24¼", flask length 44¼" with roll-off conveyor.

No. 703-5 Osborn, same as above, exceptins 17 x 35" table.

PLAIN JARRING MACHINES

60 x 60" Tabor, 14" dia. cyl., 8500 lbs. cap. @ 80 lbs. press.

42 x 60" Tabor, 13" dia. cyl., 7500 lbs. cap. @ 80 lbs. press.

JOLT SQUEEZE STRIPPERS

No. 113 Milwaukee, open end type, portable 500-lbs. cap. @ 80 lbs., 6" draw, 16 x 36" table.

Osborn No. 82 STRIPPING PLATE JOLT SQUEEZER, 46" between rods, 10" draw, 1200 lbs. jolting cap., 1000 lbs. stripping cap., 24 x 36" table pin lifts 12" part one way, 36" the other.

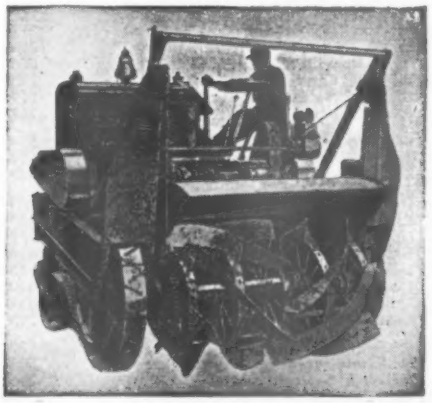
Nicholls Type "D" stationary heavy duty, JOLT SQUEEZE & PATTERN DRAW, squeeze piston 14", jolt piston 6", draw 2-6"—distance between strain rods 40" take approx. 15 x 24" flask.

Osborn No. 550-22 pit type JOLT STRIPPER stationary pin centers 16 x 32"—table 32 x 36"

AMERICAN SANDCUTTERS

Cleveland-American (similar to Model "K" 84" spiral cutting cyl., 36" dia., 92" between tractor wheels 5" face, 6' dia.—equipped with Cleveland 3-phase 60 cycle 220V AC Motors. Cable and Take-Up Reel.

American Model "CP" size 72, having 72" cutting cyl., 90" between tractor wheels, tractor wheels 50" dia., 5" face, equipped with Hercules Gas Engine.



American Model "AA" Sandcutter sz. 84, 72" cutting cyl., 84" between tractor wheels—complete with 10 HP, 3 phase 60 cyc. 220V AC Motor, Cable and Take-up Reel.

POSITIVE PRESSURE BLOWERS

No. 4 Roots, 14 x 48" — 13 ft. displ. 14" top discharge, pulley drive.

No. 5½ Roots, 18 x 63"—18" dia. top discharge, arranged for motor drive with Link-Belt Chain (without Motor) on CI base plate.

No. 5½ Roots (High Pressure) 18 x 42½"—18 ft. displ.—2 lbs. press., belt drive, top discharge.

No. 6 Piqua, 21 x 60" — 35 ft. displ. 20" top discharge, single gear, mounted on bed plate (without motor).

CUPOLA CHARGING CRANE

1—Shepard 3-Ton Cap. 3 phase 60/220 Volt Cupola Charging Crane Cab Operated.

MAGNET

1—24" Dia. Cutler-Hammer Magnet 220V DC.

OVERHEAD ELECTRIC TRAVELING CRANES

10-ton approx. 30'7" span, 3-motor type, Northern Electrical 115 V DC Motors. Hoist 15 HP 750 RPM, Rack 3 HP 1200 RPM, Bridge 7½ HP 950 RPM. EC&M Controllers, cage oper., 24" double "I" Beams, cast iron truck ends. chain Lifts.

1-ton Euclid 1-motor single "I" beam girder hand operated CRANE, equipped with Electric Hoist 3/60/440 V. AC Motor, approx. span 30 ft.

1-ton Detroit Type "H" Lohed Room, approx. 29 ft. span, 12" double "I" beam girders, 9 ft. lift, floor control Watson Induction Type "KH" 3/60/220 V. AC Motors, approx. 40" clearance.

3-ton MILWAUKEE 3-motor Type "C" GANTRY CRANE (suitable for 5-tons) 230 V. DC Motors, lattice type girders, structural end trucks, enclosed cage at one end, approx. span 31'6", 1 ft 25 ft. overhang each side approx. 12 ft., single drum parallel with bridge girders, including ½ yd. single line perforated BUCKET for same.

ELECTRIC HOISTS

3-ton Link-Belt single point suspension with Top Hook (or can add Trolley if required). Floor operated, mechanical lowering brake, 18' lift, speed 18 FPM, equipped with 115 volts, DC motor, or can rewind for 220 V. DC service.

1-Ton Shepard equipped with 220 V DC Motor.

ELECTRIC BUCKETS

2-Yd. Hayward ELECTRIC COAL BUCKETS equipped with Shepard Hoisting Unit, 10 HP, 230V DC Motor.

1½-Yd. Hayward Elec. equipped with Class "B" 6 HP 230V DC Electro Dynamic Motor—Hoist Cap. 8000 lbs.

1-Yd. Electric—equipped with D.C. Motor, dim. when closed 50" width, 72" length.

MISCELLANEOUS

Blystone 9-11 ft. MIXER, clutch pulley drive-side discharge, complete with 10 HP GE KT-751 220V AC 1800 RPM Motor.

Hausfeld Style 1000, 100# cap. stationary ALUMINUM FURNACE, with cast iron pot, gas-fuel oil.

No. 27-D Excelsior Single Spindle AUTOMATIC GRINDING AND POLISHING MACHINE, grinding cap. up to 60" sq., pulley drive (floor space required 9 x 12 ft.)

Universal SAND THROWER, stationary, on bed-plate, direct connected to GE 7½ HP 220V AC Motor.

SCULLY MACHINERY & EQUIPMENT CORP.

2031 WEST 74th STREET (Phone PROspect 8770) CHICAGO 36, ILLINOIS

ADVERTISING INDEX

Abrasive Co. 34
Acme Aluminum Alloys, Inc. 168
Acme Foundry Co. 245
Adams Co., The 190, 191
Air Reduction 61
Air-Way Pump & Equipment Co. 255
Ajax Electric Co., Inc. 202, 203
Ajax Electric Furnace Corp. 202, 203
Ajax Electrothermic Corp. 202, 203
Ajax Engineering Corp. 202, 203
Ajax Metal Co. 202, 203
Alloy Metal Abrasive Co. 261
Aluminum Refiners Div. of Bohn Aluminum & Brass Corp. 17
Aluminum Research Institute 56
Alvey Ferguson Co., The 244
American Air Filter Co., Inc. 239
American Bridge Co. 253
American Colloid Co. 42
American Crucible Co. 224
American Foundry Equipment Co. 106, 107, 166, 238
American Gum Products Co. 251
American Machine & Metals, Inc. 210, 275
American Monorail Co., The 125
American Optical Co. 233
American Smelting & Refining Co., Federated Metals Division 205
American Steel Abrasives Co., The 265
Apex Smelting Co. 20
Arcade Manufacturing Co. 259

Baker Perkins, Inc. 169
Bar-Ray Products, Inc. 278
Bartlett C. O., & Snow Co. 175
Bay State Abrasive Products Co. 118
Beardsley & Piper Co., The 154, 155
Bellevue Industrial Furnace Co. 256
Berkshire Mfg. Co. 274
Bethlehem Steel Co. 1
Blaw-Knox Div. of Blaw-Knox Co. 40
Bloomsbury Graphite Co. 245
Blystone Div. Standard Sand & Machine Co. 279
Bohn Aluminum & Brass Corp. 17, 52
Brooke, E. & G., Iron Co., The 275
Buehler, Ltd. 275
Buell Engineering Co., Inc. 99
Buffalo Pattern Works, Inc. 33

Calder Mfg. Co. 276
Campbell-Hausfeld Co., The 152
Canadian Radium & Uranium Corp. 250
Cannon Vibrator Co. 274
Capewell Mfg. Co., The 218
Carborundum Co., The 229
Carl-Mayer Corp., The 199
Carman, Edwin S., Inc. 240
Centrifugal Casting Machine Co. 272
Certified Core Oil & Mfg. Co. 129
Chain Belt Co. 64
Champion Foundry & Machine Co. 8, 9
Chicago Manufacturing & Distributing Co. 145
Chicago Rawhide Mfg. Co. 275
Chicago Tramrail Co. 170
Chicago Wheel & Mfg. Co. 174
Cities Service Oil Co. 259
City Pattern Foundry & Machine Co. 215
Clark Tructractor Div. of Clark Equipment Co. 247
Clearfield Machine Co. 54
Cleveland Chaplet & Mfg. Co. 270
Cleveland Electro Metals Co., The 226
Cleveland Flux Co., The ..... Front Cover
Cleveland Quarries Co., The 271
Cleveland Tramrail Division, The Cleveland Crane & Engineering Co. 120, 121
Cleveland Vibrator Co., The 273
Climax Molybdenum Co. 135
Columbia Steel Co. 253
Combined Supply & Equipment Co. 268
Conco Engineering Works, Division of H. D. Conkey & Co. 224
Conover Engineering Co. 269
Construction Machinery Co. 274
Continental Machines, Inc. 45
Corn Products Sales Co. 133
Cortland Grinding Wheels Corp. 158
Cunningham, M. E., Co. 240
Curtis Pneumatic Machinery Co. 267

Davenport Machine & Foundry Co. 37
Dayton Oil Co., The 103
DeBardeleben Coal Corp. 265
DeBothezat Ventilating Equipment Div., American Machine & Metals, Inc. 275
Delta Oil Products Co. 12
Demmler, Wm., & Bros. 176, 280
Dempsey Industrial Furnace Corp. 214
Desmond-Stephan Mfg. Co. 280
Despatch Oven Co. 46
Detroit Electric Furnace Division Kuhlman Electric Co. 160
Detroit Star Grinding Wheel Co. 269
Diamond Clamp & Flask Co. 36
Dietert, Harry W., Co. 248
Dings Magnetic Separator Co. 161
Dollinger Corporation 207

Eastern Clay Products, Inc. 130
Electro Metallurgical Co. 29, 47
Elkhart Pattern Works 268
Elwell-Parker Electric Co., The 35
Empire Varnish Co., The, Waterlox Div. 263
Erie Steel Construction Co. 274

Fanner Manufacturing Co., The 70
Federal Foundry Supply Co., The 2, 147, 243
Fisher Furnace Co. 23
Foundry Equipment Co., The 178, 179
Foundry Rubber Compounds Corp. 195
Foundry Services, Inc. 232
Foundry Supplies Mfg. Co. 162
Fox Grinders, Inc. 261
Freeman Supply Co., The 72
Fremont Flask Co., The 197

Gardner-Denver Co. 66
Gehnrich Oven Division, W. S. Rockwell Co. 44
General Blower Co. 268
General Chemical Co. 181
Giele, Walter, Co. 270
Globe Iron Co. 60
Great Lakes Foundry Sand Co. 15
Great Western Mfg. Co. 255
Greene Electric Furnace Co. 280
Greenfield, Samuel, Co., Inc. 256
Grimes Molding Machine Co. 267

Hammond Machinery Builders, Inc. 259
Hanna Furnace Corp., Div. National Steel Corp. 59
Harnischfeger Corp. 16
Haskins, R. G., Co. 254
Hauck Manufacturing Co. 280
Hercules Powder Co., Inc. 143
Herman Pneumatic Machine Co. 189
Hickman, Williams & Co., Inc. 220
Hines Flask Co. 58
Hydro-Blast Corp. 41

Illinois Clay Products Co. 222
Illinois Testing Laboratories, Inc. 230
Imperial Belting Co. 188
Independent Pneumatic Tool Co. 27, 235
Industrial Equipment Co. 273
Ingersoll-Rand Co. 57
International Molding Machine Co. 126, 127
International Nickel Co., Inc., The 97
Ironton Fire Brick Co., The 201

Jackson & Church Co. 251
Jackson Iron & Steel Co., The 217
Jeffrey Manufacturing Co., The 264
Johns-Manville 208
Johnson Corp., The 273
Johnston & Jennings Co., The 209
Johnston Mfg. Co. 267

Kawin, Chas. C., Co. 204
Kirk & Blum Manufacturing Co. 32
Kling Bros. Engineering Works 249

Laboratory Equipment Corp. 262
Lanly Co., The 50
Lindberg Engineering Co. 221
Link-Belt Co. ..... Back Cover
Link-Belt Speeder Corp. 177
Liquid Carbonic Corp., The 279
Lithaloys Corp. 231
Logan Company 223

McCormick, J. S., Co. 30
McDonald Charcoal Co. 282
McLain's System, Inc. 276
Macklin Co. 14
Machlett Laboratories, Inc. 159
Maehler, Paul, Co. 68
Magnaflux Corp. 69
Mahr Manufacturing Co. 252
Mall Tool Co. 271
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc. 263
Marathon Chemical Company Div. of Marathon Corp. 219
Marshall, L. H., Co. 246
Master Electric Co. 43, 269
Master Tool Co., Inc. 123
Mathews Conveyer Co. 115
Mathieson Alkali Works (Inc.) Inside Front Cover
Michigan Smelting & Refining Div. of Bohn Aluminum & Brass Corp. 52
Midwest Foundry Supply Co. 277
Milwaukee Chaplet & Mfg. Co. 194
Milwaukee Foundry Equipment Co. 48, 49
Minco Products Corp. 167
Mine Safety Appliance Co. 212
Modern Equipment Co. 290
Moline Iron Works 255
Molybdenum Corp. of America 157
Murphy, James A., & Co. 282

National Carbon Co. 151, 183
National Engineering Co. 10, 11
National Steel Corp. 59
Neff & Fry Co., The 279
New Haven Vibrator Co. 253
Niagara Falls Smelting & Refining Corp. 172
Nichols Engineering & Research Corp. 281
Northern Boiler Co., The 265
North American Mfg. Co., The 22
Norton Co. 28
Nugent Sand Co. 261

Ohio Ferro-Alloys Corp. 65
Oliver Machinery Co. 281
Osborn Manufacturing Co., The 140, 141
Ottawa Silica Co. 193

Page Belting Co. 282
Pangborn Corporation 6, 7, 150, 278
Parsons Engineering Corp. 269
Payne, W. Harvey 278
Peninsular Grinding Wheel Co. 18, 19
Penn Iron Works 281
Pennsylvania Foundry Supply & Sand Co. 241
Penola, Inc. 138
Peters-Dalton, Inc. 213
Philco Corporation 109
Pioneer Mfg. Co. 240
Pittsburgh Crushed Steel Co. 277
Pittsburgh Lectromelt Furnace Corp. 186
Plaster Process Castings Co. 262
Pollard Oil Products Co. 270
Producers Core Sand Corp. 280
Propellair, Inc. 236
Pyrometer Instrument Co., The 266

Radium Chemical Co., Inc. 241
Ransohoff, N., Inc. 67
Reading Chain & Block Corp. 228
Republic Coal & Coke Co. 260
Republic Steel Corp. 39
Riehle Testing Machine Division—American Machine & Metals, Inc. 210
Robeson Process Co. 251
Robins Conveyors Incorporated 200
Roots-Connersville Blower Corp. 226
Ross, J. O., Engineering Corp. 171
Royer Foundry & Machine Co. 13
Ruemelin Mfg. Co. 228

Schneible, Claude B., Co. 71
Schrader's, A., Son, Div. of Scovill Mfg. Co., Inc. 173
Schramm, Inc. 163
Schundler, F. E., & Co., Inc. 184
Scientific Cast Products Corp., The 272
Screen Equipment Co., Inc. 271
Scully Machinery & Equipment Corp. 287
Shepard Niles Crane & Hoist Corp. 156
Silverstein and Pinsof, Inc. 24
Simonds Worden White Co. 198
Simplicity Engineering Co. 21
Skilsaw, Inc. 38
Sly, W. W., Mfg. Co., The 113
Smillie, C. M., & Co. 26
Smith Facing & Supply Co. 234
Smith, Werner G., Co., The 4, 5
Smooth-On Manufacturing Co. 280
Sonken-Galamba Corp. 31
SPO, Inc. 153
Standard Conveyor Co. 180
Standard Electrical Tool Co., The 282
Standard Silica Corp. 282
Stearns Magnetic Mfg. Co. 192
Steel Conversion & Supply Co. 266
Steel Shot & Grit Co. 277
Sterling Grinding Wheel—Division of the Cleveland Quarries Co. 110, 185
Sterling Wheelbarrow Co. 187
Stevens, Frederic B., Inc. ..... Inside Back Cover
Strand, N. A., and Co. 230
Stroman Furnace & Engineering Co. 25
Sturtevant, B. F., Co. 196
Sullivan Machinery Co. 62
Syntron Co. 263

Tabor Manufacturing Co., The 53
Tannewitz Works, The 182
Thomas Truck & Caster Co. 276
Titanium Alloy Mfg. Co. 211
Tonawanda Iron Corp. 63
Triplett & Barton 55
Truscon Steel Co. 249

Union Carbide & Carbon Corp. 29, 47, 151, 183
United Compound Co. 247
United Oil Mfg. Co. 51
United States Graphite Co. 105
U. S. Steel Corporation and Subsidiaries 253
U. S. Steel Export Co. 253

Velsicol Corp. 149

Wall Chemicals Div. of The Liquid Carbonic Corp. 279
Wellman Engineering Co., The 282
West Co., The 277
Western Tool & Mfg. Co., The 278
Whiting Corp. 137, 164, 165
Wickland, A. A., & Co. 272
Woodison, E. J., Co., The 206
Wood Shovel & Tool Co. 117
Woodward Iron Co. 101
Wrigley, Wm., Jr., Co. 216

Young Brothers Co. 227

Table of Contents, Page 3

Refer to alphabetical list of products in "Where-to-Buy" pages, beginning on Page 242

Classified Advertisers, Pages 283, 284, 285, 286, 287

Production ZOOMS with Parsons

BLAST ROOMS & BLAST CABINETS

Parsons Sand Blast Rooms are engineered and designed for fast, thorough cleaning at minimum cost. Whether production is high or low our equipment will return major profits in boom times, and allow you to compete at an operating profit in slow times.

Par-Blast rooms are furnished in a number of designs, depending on the work or pieces to be cleaned. The Turn-table, Car, Monorail and small Cabinet types are all outstanding in their particular field and have gained world wide recognition on performance and economy.

You will find Parsons creative engineering in all types which means faster and more thorough cleaning, simplified and easier operation at lower operating costs. Send for free bulletin or better yet let us have your blast cleaning problems. We will be glad to suggest equipment best adapted to your specific work.

PARSONS ENGINEERING CORPORATION

2545 E. 79th St. • CLEVELAND, OHIO

The MODERN Method of Charging

for Post War Operations

Foremost foundry operators are now laying their plans for the necessary post-war efficiency.

For charging efficiency, they are including in their programs *Modern Cupola Chargers*—both for economy in operation and best melting control. For the Modern Drop Bottom Bucket lays in a charge perfectly stratified equal to the best of hand charging.

Highest efficiency can be obtained with the magnet crane arrangement shown above. The charger unit is swiveled to serve the four cupolas above, two simultaneously. Other models furnished for cupolas of all sizes.

Write us for Catalogue No. 143A giving complete details

MODERN EQUIPMENT COMPANY

PORT WASHINGTON, WISCONSIN

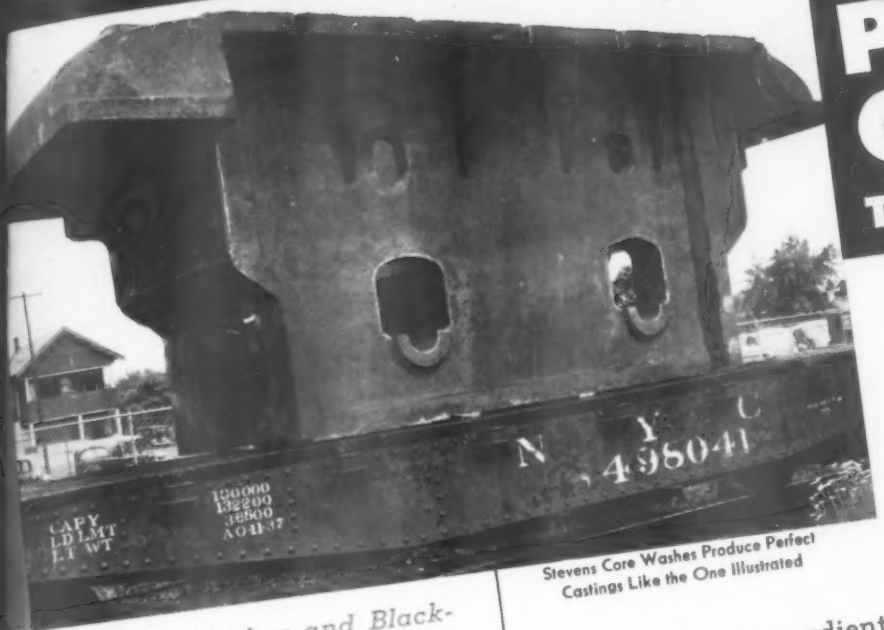
Cupolas • Cupola Chargers • Covered & Insulated Ladles • Lifetime Geared Ladles • Improved Bottom Pour Ladles • Metal Pouring Systems • Crane & Monorail Systems For Metal & Mold Handling • Furnace Charging Cranes • Electric Mold Skin Driers

MODERN EQUIPMENT Co
PORT WASHINGTON, WIS
DEPT. 204

STEVENS

Balanced Core Coatings

PRODUCE PERFECT CASTINGS THRU THESE 5 BALANCED FEATURES



Stevens Core Washes Produce Perfect Castings Like the One Illustrated

ADHERENCE—The correct percentage of binder is used to insure against the metal washing the coating off the cores, but not to produce excessive gas.

SUSPENSION—The proper percentage of a special ingredient is used to hold the material suspended in water so that no agitation of the solution is required, but not so much that excessive water is required for a given consistency Excess water means more heat needed for drying the coating.

PENETRATION—Ingredients are blended so that the wash solution will not penetrate too deeply, leaving too thin a surface film, yet will penetrate sufficiently to give depth of protection against hot metal and at the same time provide good surface coverage.

FLOWABILITY—The wash runs off evenly, does not form "tears" or "runs," and flattens out to a smooth, uniform surface on drying.

PERMEABILITY—Oven drying or proper torch drying do not blister nor lift the coating from the sand. Coatings can "breathe," hence danger of "blows" is eliminated.

Stevens Core Washes and Blackings are widely known for their excellent performance—due to their high quality ingredients—the percentages of which are balanced and compounded to a fine degree . . .; eliminating the "out-of-balance" characteristics of many coatings.

Stevens Core Washes and Blackings help you produce perfect castings. They have high heat resistance . . . are complete compounds requiring the addition of no other ingredient—just mix with water and use. Their simplicity of use—consistency and uniformity from one batch to another, make them your *best buy.*

"The Wise Buyer Buys—Stevens Supplies"

Write and tell us what metal you are pouring—type and size of castings you are making—whether green or dry sand. We will gladly make our recommendations and send working sample of the right Core Wash for your job.

STEVENS EVERYTHING FOR A FOUNDRY DETROIT MICHIGAN

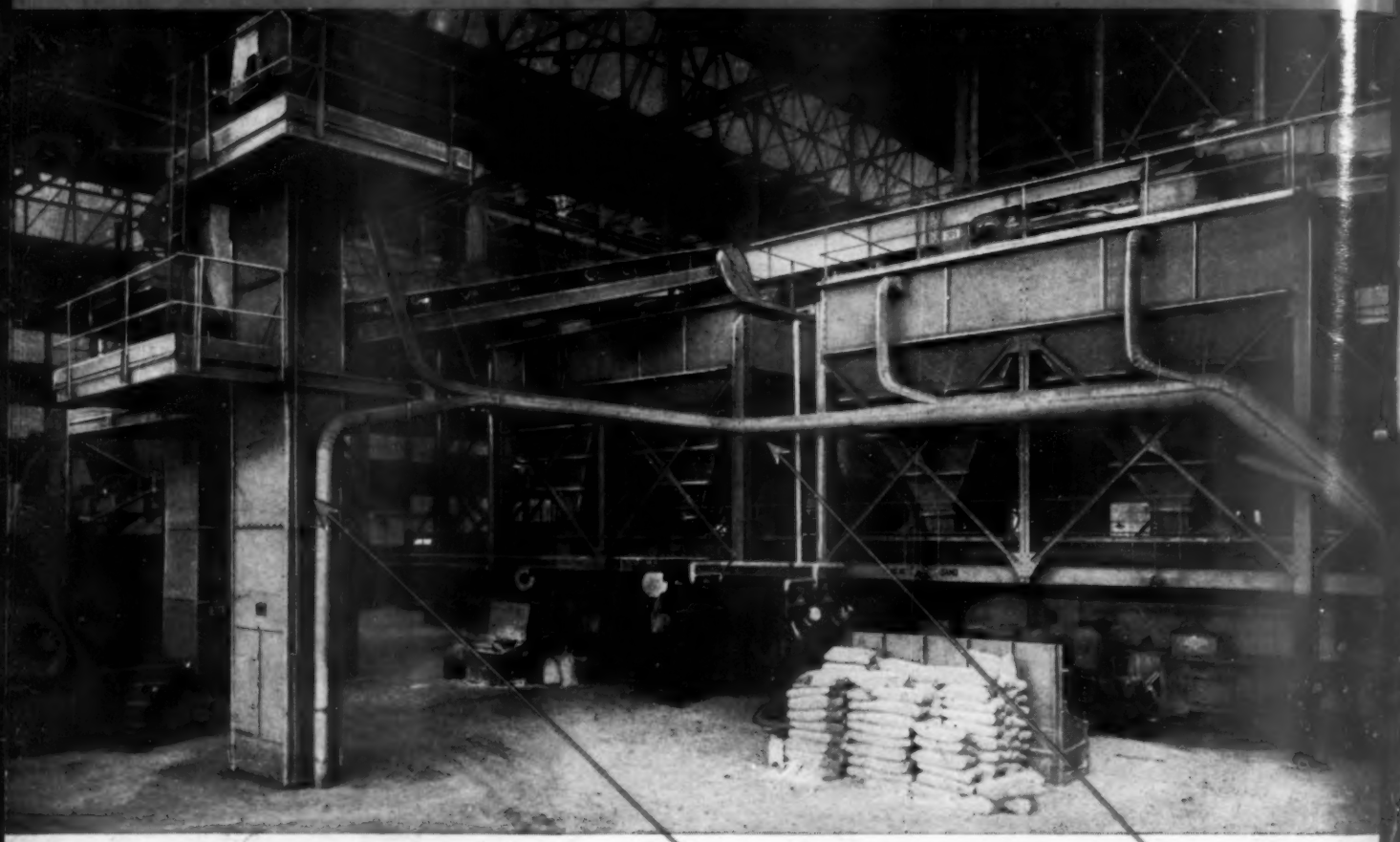
FREDERIC B. STEVENS INCORPORATED

DETROIT 26 MICHIGAN

NEW ENGLAND . . . . . 188-182 Brewery St., New Haven, Conn.
NEW YORK and PENNSYLVANIA . . . . 93 Stone St., Buffalo, N. Y.
INDIANA . . . . Hoosier Supply Co., 36 S. Cruse St., Indianapolis, Ind.

• CANADA . . . . FREDERIC B. STEVENS OF CANADA, LIMITED
• 1262 McDougall St. . . . . Windsor, Ontario
• 2368 Dundas St. West . . . . . Toronto, Ontario

RELIEVE CONGESTION— SPEED PRODUCTION



With Mechanical Sand Handling and Preparation

● A well engineered sand handling system will not only relieve foundry congestion, promote good housekeeping and make scientific sand control possible, but will also enable almost any foundry to obtain greater production at lower cost and make better castings. The Link-Belt system illustrated above, provides for storage of sand above the mixers after having been screened, de-dusted and magnetically cleaned. Thus, used sand having known qualities, is provided as the main body of each batch. Storage facilities for new sand (which has been previously processed in a Link-Belt Roto-Louvre dryer), is provided, once again giving the operators a controlled material. Beneath the bins, delivery of materials to a batching medium is through mechanically operated gates, relieving the operators of physical effort. Weigh boxes, electrically operated and push button controlled, again provide effortless handling of bulky materials. "Eye-level," easily-read dials give the operators minute control over each and every batch to the mixers. Cross transfer of materials from any bin to any mixer is easily and quickly performed. Automatic operation of one or more mixers can be provided, or push button control of individual operation can be attained at the will of the operator. Mixers are located for accessible "sampling" operation to give the operator continued control of batch characteristics.

Let our experienced foundry engineers help you in applying correctly designed and easily adapted Link-Belt units to meet your individual conditions.

LINK-BELT COMPANY

9672

Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Dallas 1, Minneapolis 5, San Francisco 24, Toronto 8.
Offices in principal cities.

Chicago Plants | Indianapolis Plant | Ordnance Plant | San Francisco Plant

LINK-BELT CONVEYORS

AND PREPARATION MACHINERY